D 614
19.09.07 AM
REV. 01

SEQUENCE CONTROLLER FOR 2 TO 5 ELECTRIC LOADS (e.g. PUMPS)

C ←BUS

IPG 658 C1 Eng.

- **Control of several pumps**
- **Prioritising control of electric loads**
- **5 On-Off relay outputs to control in sequence up to 5 electric loads (e.g. pumps)**
- **2 digital inputs for control of each single load**
- **Automatic replacement of unavailable loads**
- **On-Off or progressive 0…10 V– control for cutting in pumps**
- **Choice between one group up to 5 loads and two groups totalling 5 loads**
- **C-Bus for Telemanagement.**
- **Installation on DIN rail.**
- **Power supply 230 V ~**

CE

1. APPLICATION

IPG 658 C1 is designed for use on all sites with electric or hydraulic equipment where it is necessary to cut in a certain number of loads in a programmed sequence with automatic replacement of faulty loads by spare ones.
Additionally, the system permits cutting in a number of loads, proportional to a 0…10 V input, thereby operating as an automatic sequence controller for electric loads such as pumps.
Typical uses:
– Control of a certain number of pumps (a single group of up to 5, or two groups, one of 2 pumps and the other of 2 or 3 pumps) which have to operate in sequence, and at the same time switch on the spare pumps.
– Control of a certain number of electrical loads tied to permitted (special tariff) consumptions, thereby assigning priorities to certain loads.
– Option of extending the system to an indefinite number of loads by using accessories such as CSC 328 (0…10) signal convertor.

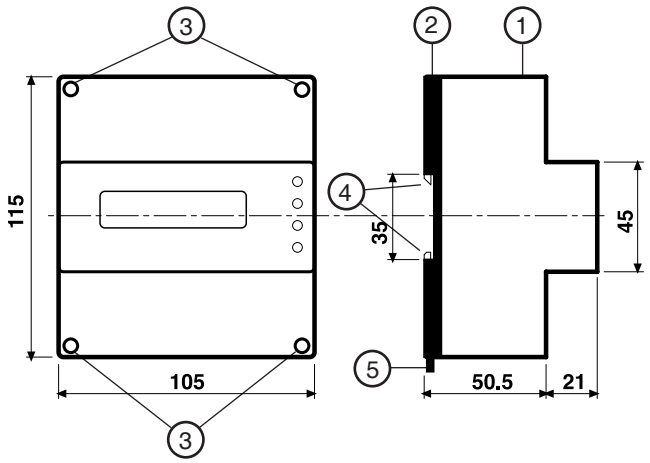
2. OPERATION

The main functions of IPG 658 C1, for a single group or two groups, are :
• 5 On-Off relay outputs to control the loads (e.g. pumps).
• 5 digital inputs to indicate if the loads are available before controlling them (e.g. thermal overload switch of the contactor).
• 5 digital inputs to indicate if the loads are available after the control signal (e.g. flow switches).
• 1 digital input for general enabling of the control system for each group.
• 1 analogue input (as alternative to above) for the progressive control of the loads in each group.
• 1 digital input for changing the total number of loads that you wish to switch on (only with SINGLE GROUP).
• 1 relay output for general local alarm.
• Ample possibilities for programming the system and the single load as Automatic, Manual and Off.
• Automatic timed sequences for optimising load operating times.
• Automatic warning when a load has reached the number of operating hours for maintenance.
• Data logger for recording all the main events.
• Complete Telemanagement.

3. TECHNICAL DATA

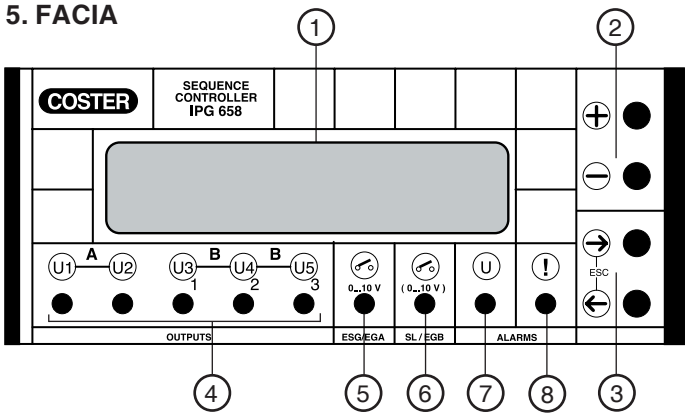
Power supply	230 V~ ± 10%
Frequency	50…60 Hz
Consumption	5 VA
Protection	IP40
Radio disturbances	VDE0875/0871
Vibration test	with 2g (DIN 40 046)
Construction standards	Italian Electrotech. Committee (CEI)
Enclosure	DIN 6E module
Installation	on DIN 35 rail
Materials:	
Base	NYLON
Cover	ABS
Ambient temperature:	
Operating	0…45 °C
Storage	– 25…+ 60 °C
Ambient humidity	Class F DIN 40040
Dimensions	105 x 115 x 71.5
Weight	0.6 kg
5 On-Off outputs with voltage-free switches :	
maximum switched voltage	250 V~
maximum switched current	5 (1) A
1 general alarm relay, maximum switched current as above	
10 On-Off inputs :	
for available load	5
for operational control	5
2 On-Off or 0…10V inputs for progressive control or for changing sequence to SINGLE GROUP	
The unused inputs, if the loads are less than 5, become external alarm inputs, available for any use	

4. 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

5. FACIA



1 – Two-row 16-character backlighted alphanumeric display
2 – + and – keys
3 – ← and → keys
4 – LEDs for status and On-Off controls for the loads
U1 + U2 + U3 + U4 + U5 = status of loads (Max. 5) SINGLE GROUP
U1 + U2 = status of the 2 loads in GROUP A
U3 + U4 + U5 = status of the 2 or 3 loads in GROUP B (1, 2, 3)
LEDs flashing: loads not available because of intervention by thermal overload relay or confirmation (lacking or external)
5 – LED input for general enabling of the loads (if digital) in SINGLE GROUP or in GROUP A or input of at least 1 V (if analogue) SINGLE GROUP or GROUP A
6 – LED input for changing number of simultaneous loads in SINGLE GROUP or general enabling of loads in GROUP B or input of at least 1 V (if analogue) GROUP B
7 – LED for any alarm regarding the loads or other (e.g. lockout burner)
8 – Fault LED

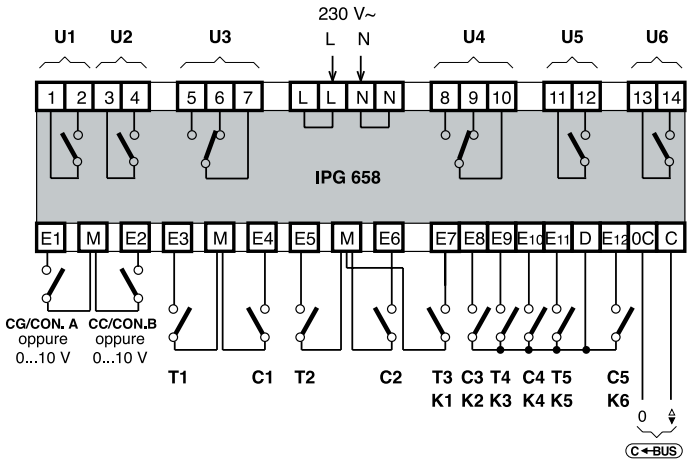
6. INSTALLATION

The controller must be installed in a dry location that respects 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.
The controller can be mounted on a DIN rail and housed in a standard DIN enclosure.

7. ELECTRICAL CONNECTIONS

Proceed as follows :
• Separate base and cover after having removed the securing screws
• Mount the base on the DIN rail and check that the securing elements (5.4) anchor it securely
• Make the electrical connections strictly according to the diagram and to the safety regulations in force using the following cables :
– 1.5 mm² for the power supply and the relay control outputs.
– 1 mm² for sensors.
– 1 mm² for C-Bus. For length limits see Technical Data Sheets T 021.
• Switch on power (230 V~) and check its presence at terminals L and N.
• Switch off power, replace the cover on the base/terminal block and secure it with the four screws supplied (5.3).
You are advised not to insert more than two cables in a single terminal and, if necessary, to use an external terminal block.

8. WIRING DIAGRAM



The output relays are shown with the coil switched off.

U 1...5 – On-Off switches for loads in SINGLE GROUP or :
U 1...2 – On-Off switches for loads in GROUP A (Max 2 loads)
U 3...5 – On-Off switches for loads in GROUP B (Max 3 loads)
U6 – Alarms switch for local warning
ESG/CON.A – Digital input for enabling loads in SINGLE GROUP or GROUP A alternatively
– analogue 0…10 V input for progressive switching on of loads in SINGLE GROUP or GROUP A
SL/EGB – Digital Input for changing the number of loads switched on simultaneously in SINGLE GROUP alternatively if two groups programmed:
– digital input for enabling loads in GROUP B alternatively
– analogue 0…10 V input for progressive switching on of loads in GROUP B
T1...T5 – Switches for availability of the loads before switching on (e.g. thermal overload relays)
C1...C5 – Switches for confirming that loads in operation after switching on (e.g. flow switches))
C-Bus – Data transmission via Telemanagement
K1...K6 – External switches for alarms & status

9. COMMUNICATION

9.1 C-Bus communication for Telemanagement (for detailed information see data sheet T 021)

By means of the C-Bus output, IPG 658 C1 can be Telemanaged (two-way data exchange) by one or more local PCs and/or from a remote central control computer via PSTN.
From the PC or PCs you can display and/or adjust:

– the data and values set on the display pages of the controllers and the configuration data of the units dedicated exclusively to Telemanagement (see 3. TECHNICAL DATA).
– the operational status of the site components (pumps, auxiliaries in general)
– acquire alarms coming from the site.

9.2 Telemanagement address

M1.5

```
Address  :   –
Group    :   –
```

When using 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 characteristics.
When Telemanagement is not scheduled, the address should be left in memory (– – –).
To cancel the values, keep + and – keys pressed at the same time.

9.3 Sending alarms

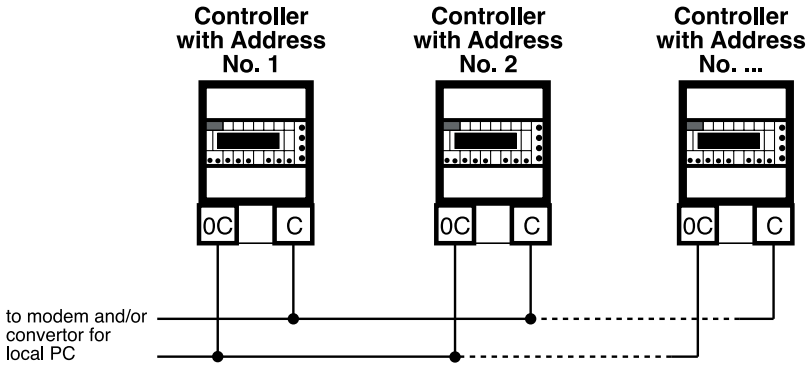
M1.4

```
Send Alarms :NO
PassWTeleman:NO
```

• **Send Alarms :** NO = alarms not transmitted.
YES = alarms are transmitted to central PC.

• **Chiave Teleges** : NO = password not enabled.
YES = password enabled.

9.4 C-Bus electrical connection



10. OPERATION

In explaining the operations, reference is always made to pumps, even if the system can operate any type of load.
IPG 658 C1 can control at the same time a number (M) of pumps (from 1 to 5), out of a total group of pumps (N)installed (from 2 to 5), and can create all possible sequences for switching on M pumps, out of the N pumps available, and making equal the operating times of each individual pump, over a certain period.
One particular pump may not be available for several reasons:

– the thermal overload relay of the contactor has tripped;
– the flow switch does not give a warning signal even if the pump has been switched on (e.g. defective motor);
– the pump is not controlled by IPG 658 C1 but in function of the status of the inputs C1…C5.
– the pump is being serviced.

When carrying out the sequences, IPG 658 C1 takes account of all the above factors and switches on automatically the other reserve pumps.
It is possible to change the sequences after a programmed number of days.
The digital switch for general enabling serves to switch the whole system On or Off: for example, the control of the circulation pumps by means of a compensating controller.
The same input can be used in the analogue mode (0…10V) to switch on a number M pumps proportional to the input itself.
If the system is used with less than 5 pumps, the surplus inputs for the thermal overload relays and the flow switches are used as external alarm inputs.

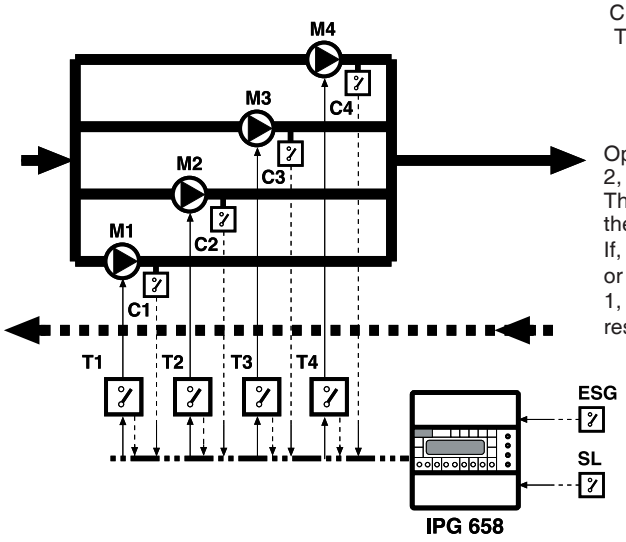
Besides controlling a SINGLE GROUP of up to 5 pumps, IPG 658 C1 can control the pumps in two GROUPS:

– GROUP A = the first group comprising 2 loads (outputs U1 and U2)
– GROUP B = the second group comprising 2 or 3 loads (outputs U3, U4 and U5)

All the functions are exactly the same as those for the SINGLE GROUP and so the system can control two groups of pumps on two different sites, applying to each group all the functions previously described.

11. EXAMPLES OF SITES

11.1 Site with a single group of 4 twin pumps installed and three running in sequence at the same time



M1... 4 – pumps installed
C1...C4 – flow switches
T1...T4 – contactors with thermal overload relay closing
ESG – enabled for operation by a controller with outside sensor
SL – switch for changing number of loads

Operation : the pumps operate in groups of 3 in sequence : 1, 2, 3 2,3,4 3,4,1 4,1,2 and so on
The thermal overload relay and the flow switches confirm that the pump, once switched on, is actually in operation.
If, for example, pump 3 should trip the thermal overload relay or no longer continues to operate, the sequence will change to 1, 2, 4 and continue in this way, since pump 4 has become the reserve for pump 3.

Configuration

M1.1
Group of loads
SINGLE GROUP

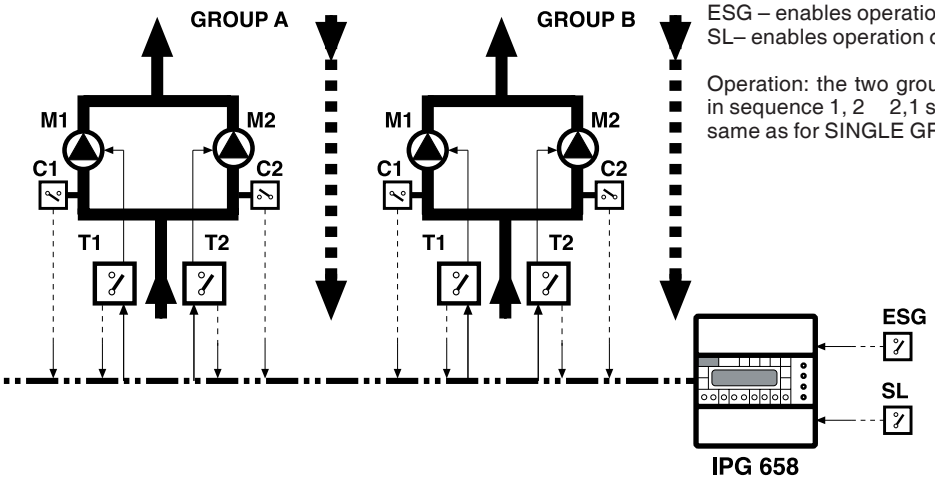
M2.1
Number of loads
installed: 4

M2.2
Number of loads
simultaneous: 3

M2.9
ThermalOL relays
On = CLOSED

M2.10
ConfirmOperating
On = CLOSED

11.2 Site with two groups of twin pumps installed



M – pump installed
C – flow switches
T – contactors with thermal overload relay closing
ESG – enables operation of GROUP A
SL– enables operation of GROUP B

Operation: the two groups of twin pumps operate in sequence 1, 2 2,1 switching logic is exactly the same as for SINGLE GROUP.

Configuration

M1.1
Group of loads
GROUP A+ GROUP B

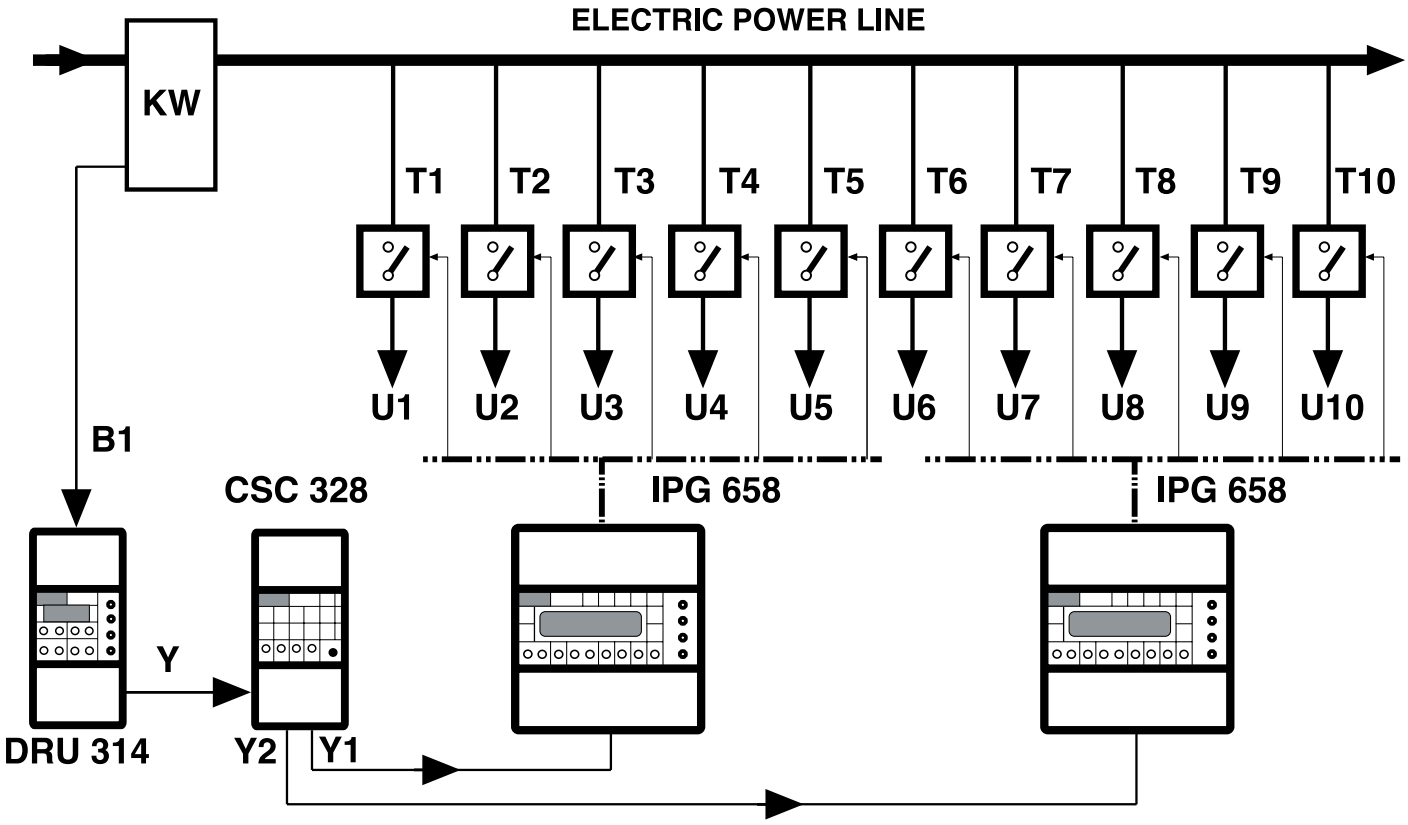
M2.1
Number of loads
installed: 2

M2.2
Number of loads
simultaneous: 1

M2.9
ThermalOL relays
On = CLOSED

M2.10
ConfirmOperating
On = CLOSED

11.3 Control of 10 electric loads, with choice of priority sequences



KW – converter of measured electric power (Kilo Watt) to 0…10 V output (10 V = 100% of deliverable power)
T1...T10 – contactors for the 10 loads
U1...U10 – electric loads
B1 – output of power converter (0…10V) towards input B1 of DRU 314 universal controller
Y – 0…10 V controller output
Y1 – first output (0…10V) of CSC 328 signal converter for the first group of 5 loads
Y2 – second output (0…10V) of CSC 328 signal converter for the second group of 5 loads
IPG 658 C1 – controls of sequence priorities for the loads

Operation: the 10 loads must be arranged in sequence according to their importance priorities, so that high priority loads are provided for first and then, if sufficient power is available, the remaining loads with lower priorities.
By calibrating CSC 328 appropriately and the sequences of the two IPG 658 C1, you can modify (Telematically if required) the sequence and the priority of the 10 loads every possible way.
With the DRU 314 controller it is possible to program the percentage of the total maximum load it is not wished to exceed at any time.
If some loads are absolutely essential, you can leave them always switched on, calibrating IPG 658 C1 appropriately.

12. BASIC CONFIGURATION

The basic configuration must be carried out first since all subsequent configurations depend on this.

12.1 Single group of pumps or two groups of pumps

M 1.1

```
Group of loads
SINGLE GROUP
```

The first configuration is that of GROUP: that is, if IPG 658 C1 is to control a SINGLE GROUP of up to 5 pumps or two groups: GROUP A of 2 pumps and GROUP B of 2 or 3 pumps.
The two GROUPS A and B are quite independent of each other and can be programmed as required: it is as if in IPG 658 C1 there were actually two pump sequencers.

12.2 Alarm inputs

M 1.2

```
Alarm input K
7 8 9 10 11 12 H
```

When in SINGLE GROUP the number of pumps installed is less than 5, there become available, for each pump not installed, 2 inputs (thermal overload relay and flow switch) and these are converted into auxiliary alarms.
The auxiliary alarms go from input E7 to input E12 and are represented on the wiring diagram (8. WIRING DIAGRAM) by the external switches K1…K6.
The inputs from E3 to E6 are, of course, used for the minimum of 2 pumps installed.e. g. if 3 pumps are used, inputs E9…12 will be available and so there will be 4 inputs available for alarms.
On this display page appear only the free inputs available for alarms, which can be used or not: clearly, if 5 pumps are installed, no alarm input will be available.
If the system is configured GROUP A + GROUP B, no alarm will be available and so all the numbers from 7 to 12 will disappear.
H is the internal clock alarm which cannot be excluded.

M 1.3

```
K inputs
On = CLOSED
```

The alarm inputs, when available, can be selected as On with switch either closed or open.

13. CONFIGURATION OF SINGLE GROUP

This configuration regards the settings to be made when SINGLE GROUP has been selected and so is not displayed when the choice is GROUP A + GROUP B..

13.1 Configuration regarding the number of loads

M 2.1

```
Number of loads
installed:      N
```

N = number of loads (e.g. pumps) installed belonging to SINGLE GROUP..
This number goes from a minimum of 2 to a maximum of 5 and represents the number of pumps installed, irrespective of whether they are used or not.

M 2.2

```
Number of loads
simultaneous :M
```

M = number of loads you wish to switch on at the same time: this is to all practical purposes the number of pumps which have to operate in parallel, under normal conditions.
This number goes from a minimum of 1 to a maximum of 5; if 1 is selected, this means that one pump at a time is to be in operation, and the sequence involves making all the pumps installed operate one at a time.

M 2.3

```
Simultan loads
with SL On : 1
```

SL = external control that permits changing from the number of pumps switched on simultaneously (M) to a number (X) different from M.
Example: during the day 3 pumps may be in operation, whilst during the night (by closing the SL switch by a timer) a single pump only may be in operation, in view of the low night load and the need to limit pump noise..

13.2 Settings for the general enabling inputs

M 2.4

```
Input Enabling
On = CLOSED
```

The enabling input is the general control which permits switching on the pumps system; it is, for example, the control of the circulation pumps by a compensating controller.
This input can be
On = CLOSED: controls the pumps when the switch is closed (switch open = OFF)
On = OPEN : controls the pumps when the switch is opened (switch closed = OFF)
ANALOGUE: the input is converted by a switch to a 0…10V input; the number of pumps switched on at the same time goes from 0 to M in proportion to the value of the input in volts, with a certain hysteresis allowance to avoid excessive switching on and off.
With 0 volt no pump is switched on and with10 V M pumps are switched on.
If the SL control is switched on, with 10 V, X pumps are switched on. The 0…10V control is used over the 1…9 V range. The range (8V) is divided into a number of spaces equivalent to the number of pumps to be controlled at the same time. The space constitutes the interval, in volts, for switching on each pump; the switching off hysteresis is also equivalent to one space.
Example: 4 pumps are to be switched on at the same time:
8 : 4 = 2 V = space

ON pump 1 = 3 V (1+2 x 1)	OFF pump 1 = 1 V (1+2 x 1 -2)
ON pump 1 = 5 V (1+2 x 2)	OFF pump 2 = 3 V (1+2 x 2 –2)
ON pump 1 = 7 V (1+2 x 3)	OFF pump 3 = 5 V (1+2 x 3 -2)
ON pump 1 = 9 V (1+2 x 4)	OFF pump 4 = 7 V (1+2 x 4 –2)

M 2.5

```
Delay ON :    0m
Delay OFF:    0m
```

On this page you can program the delay switching ON and switching OFF, for the general enabling input of the pumps (M2.4). This page exists only if the input is not ANALOGUE.

M 2.6

```
Control -SL-
On = CLOSED
```

The SL control is that referred to on page M2.3.
This control can be :
On = CLOSED: control On when the switch is closed (switch open = OFF)
On = OPEN: control On when the switch is opened (switch closed = OFF)
UNUSED: the function is not used.

13.3 Settings regarding the sequence

M 2.7

```
Change sequence
every: XXX days
```

Here is entered the number of days after which a new pump sequence starts.
Example: with N = 3 and M = 2 the sequence will be 1 + 2, 2 + 3, 3 + 1, 1 + 2 and so on; the change will take place after the number of days set.

M 2.8

```
Time of sequence
change:     XX.XX
```

Here is set the time of day at which the change of sequence takes place in order to avoid, for example, the noise of the tripping of contactors or of the start-up of pumps during the night..

13.4 Control inputs regarding a single pump

Each single pump installed can be provided with two service controls so as to know at any moment its operational status and consequent availability. THERMAL OVERLOAD RELAY= the auxiliary switch of the pump contactor; this relay trips if the supply current to the pump should exceed a certain level and signals this event.
When the switch is On (relay tripped) the pump is excluded from the sequence and replaced by another available one. Clearly, this switch can be used even without the contactor, in order to exclude at certain times a particular pump.CONFIRMATION FUNCTIONS = usually the pump flow switch or any other device that can confirm that the pump is functioning after it has been switched on.
Since the flow switch can send this confirmation only after the pump has been switched on, it is first necessary to send the signal to switch on, wait for the elapse of the programmed delay (M2.11) and check the confirmation by the presence of the flow.
In the event of **unreceived confirmation** a second attempt is made, after which the pump is considered unavailable (defective) and is excluded from the sequence.(The “unreceived confirmation” status is indicated on the display by the flashing symbol Cf (M0.1...6).
When operation re-starts the pump will be again inserted in sequence, but only at the next programmed sequence change (if its insertion is included in the new sequence). The immediate re-insertion of the pump is possible only by using the Manual Sequence (M0.7) control: sending a new sequence which includes the pump then available .
IPG 658 C1 constantly checks that the confirmation status is consistent with the status of the relative output: Output On = confirmation On.
In the event of inconsistency: Output Off = confirmation On, it presumes that the pump is switched on from outside and can no longer be controlled solely by IPG 658 C1 and, as in the event of unreceived confirmation, sends an **external confirmation** alarm and excludes the pump from future sequencing programs.
The pump will be reintegrated in the sequences and controlled again by IPG 658 C1 only when the external confirmation status ceases.

M 2.9

```
ThermalOL relays
On = CLOSED
```

On = CLOSED: the tripping of the thermal overload relay results **in a closing** auxiliary switch of the contactor which signals the **non-availability** of the pump.
On = OPEN: the tripping of the thermal overload relay results **in an opening** auxiliary switch of the contactor which signals the **non-availability** of the pump.
UNUSED: the contactor is not used, or the auxiliary switch is not available.

M 2.10

```
ConfirmOperating
On = CLOSED
```

On = CLOSED: the tripping of the flow switch results **in a closing** auxiliary switch which signals **the operation** of the pump.
On =OPEN: the tripping of the flow switch is represented **by an opening switch** which signals **the operation** of the pump.
UNUSED: the contactor is not used, or the auxiliary switch is not available.

M 2.11

```
Delay confirming
operation    XXXs
```

The delay, in seconds, to permit the flow switch to trip after switching on the pump and to send to IPG 658 C1 the confirmation signal that the pump is in operation.

13.5 Pump maintenance and control alarms

M 2.12...16

```
Mainten load 1
after: XXXXX hrs
```

To each single pump can be assigned the number of operational hours after which maintenance is necessary.
Exceeding this number of hours triggers an alarm which can be sent Telematically to the system administrator..

M 2.17

```
Alarm ThOLR :  Y
AlarmConfirm:  N
```

It can be decided if the tripping of a thermal overload relay, or the unreceived confirmation from a flow switch, should trigger an alarm in order to be informed, Telematically if required, if or not there is a fault. An alarm signal is sent also for a pump momentarily not in operation.
In the event of an alarm for the presence of confirmation (the pump is controlled manually from outside), the pump will be excluded from the next attempts to re-start until the external confirmation status ceases.

14. CONFIGURATION GROUP A

This configuration regards the settings to be made when GROUP A + GROUP B has been selected, and so does not appear when the choice is SINGLE GROUP.

14.1 Settings regarding the number of pumps or other loads

M 3.1

```
Number of loads
installed:     N
```

N = number of pumps or other loads installed belonging to GROUP A.
This number is 2 fixed: the page is indicated in any event, even if unnecessary, for homogeneous representation.

M 3.2

```
Number of loads
simultaneous: M
```

M = number of pumps or other loads it is wished to switch on at the same time: this is essentially the number of pumps which have to operate in parallel, under normal conditions.
This number may be 1 or 2; if 1 is chosen, this means that one pump at a time Is to be in operation and the sequence involves switching between the two pumps installed, so that they operate one at a time.
If 2 are programmed, the pumps operate in parallel without sequence.

14.2 Settings regarding the general control inputs

The enabled input is the general control which permits switching on the system of pumps; it is, for example, the control of circulation pumps by a compensating controller.
This input can be:

M 3.3

```
Input Enabling
On = CLOSED
```

On = CLOSED: controls the pumps when the switch is closed (switch open = OFF)
On = OPEN: controls the pumps when the switch is opened (switch closed = OFF)
ANALOGUE: the input is converted from a switch to a 0…10V input; the number of pumps switched on simultaneously goes from 0 to M according to the value of the input voltage, with a certain hysteresis value in order to avoid too many on and off switchings.
With 0 volts no pump is switched on and with 10 volts M pumps are switched on.
The 0…10 V control is used in the 1…9 V range. The range (8V) is divided into a number of spaces equal to the number of pumps to be controlled at the same time. The space represents the interval in volts for switching on each pump; the switching off hysteresis is also equal to one space.
Example: 2 pumps are to be switched on at the same time ;
8 : 2 = 4 V = spazce

ON pump 1 = 5 V {1+(4 x 1)}	OFF pump 1 = 1 V {1+(4 x 1 -4)}
ON pump 2 = 9 V {1+(4 x 2)}	OFF pump 2 = 5 V {1+(4 x 2 –4)}

M 3.4

```
Delay ON : XXm
Delay OFF: XXm
```

On this page you can program the delay for switching ON and OFF at the enabling input of the pumps (M3.3). This page exists only if the input is not ANALOGUE.

14.3 Sequence settings

M 3.5

```
Change sequence:
every:XXX days
```

Enter the number of days after which a new sequence of pumps is started
Example: with N = 2 and M = 1 the sequences will be 1, 2, 1, 2, and so on; the change will take place after the number of days entered.

M 3.6

```
Time of sequence
change:    XX.XX
```

You can program the time of day at which the sequence change takes place in order to avoid, for example, the noise of the tripping of the contactors or of the start-up of the pumps during the night.

14.4 Inputs for controls regarding the single pump

Each single pump installed can be provided with two service controls so as to know at any moment its operational status and consequent availability.
THERMAL OVERLOAD RELAY= the auxiliary switch of the pump contactor; this relay trips if the supply current to the pump should exceed a certain level and signals this event.
When the switch is On (relay tripped) the pump is excluded from the sequence and replaced by another available one.
Clearly, this switch can be used even without the contactor, in order to exclude at certain times a particular pump.
CONFIRMATION FUNCTIONS = usually the pump flow switch or any other device that can confirm that the pump is functioning after it has been switched on.
Since the flow switch can send this confirmation only after the pump has been switched on, it is first necessary to send the signal to switch on, wait for the elapse of the programmed delay (M2.11) and check the confirmation by the presence of the flow.
In the event of **unreceived confirmation** a second attempt is made, after which the pump is considered unavailable (defective) and is excluded from the sequence.
(The “unreceived confirmation” status is indicated on the display by the flashing symbol Cf (M0.1…6).
When operation re-starts the pump will be again inserted in sequence, but only at the next programmed sequence change (if its insertion is included in the new sequence). The immediate re-insertion of the pump is possible only by using the Manual Sequence (M0.7) control: sending a new sequence which includes the pump then available .
IPG 658 C1 constantly checks that the confirmation status is consistent with the status of the relative output: Output On = confirmation On.

In the event of inconsistency: Output Off = confirmation On, it presumes that the pump is switched on from outside and can no longer be controlled solely by IPG 658 C1 and, as in the event of unreceived confirmation, sends an **external confirmation** alarm and excludes the pump from future sequencing programs.
The pump will be reintegrated in the sequences and controlled again by IPG 658 C1 only when the external confirmation status ceases.

M 3.7
```
ThermalOL relays
  On = CLOSED
```

On = CLOSED: the tripping of the thermal overload relay results **in the closing** of an auxiliary switch of the contactor which indicates the **non-availability** of the pump.
On = OPEN: the tripping of the thermal overload relay results **in the opening** of an auxiliary switch of the contactor which indicates the **non-availability** of the pump.
UNUSED : the contactor is not used, or the auxiliary switch is not available.

M 3.8
```
ConfirmOperating
  On = CLOSED
```

On = CLOSED: the tripping of the flow switch results in a closing switch which indicates **the operation** of the pump.
On = OPEN: the tripping of the flow switch results in an opening switch which indicates **the operation** of the pump.
UNUSED: the function is not used.

M 3.9
```
Delay confirming
operation  XXXs
```

The delay, in seconds, to allow the flow switch to trip after switching on the pump and to send to IPG 658 C1 the operation confirmation signal..

14.5 Maintenance of the pumps, control alarms and name loads

M 3.10...11
```
Mainten  load 1
after: XXXXX hrs
```

Each single pump can be assigned a number of operating hours after which maintenance is necesary.
Exceeding this number of hours triggers an alarm which can be sent Telematically to the system supervisor.

M 3.12
```
Alarm ThOLR :  Y
AlarmConfirm:  N
```

It can be decided if the tripping of a thermal overload relay, or the unreceived confirmation from the flow switch, is to trigger an alarm in order to be aware, Telematically if required, if an anomaly exists or not.
The alarm is also sent in the event of a pump being momentarily out of action.
In the event of an alarm for the presence of confirmation (the pump is operated manually from outside), the pump will be excluded from the next attempts to re-start it, until the external confirmation status ceases.

15. CONFIGURATION GROUP B

This configuration regards the settings to be made when GROUP A + GROUP B is chosen, and so does not appear when the choice is SINGLE GROUP.

15.1 Settings regarding the number of loads

M 4.1
```
Number of loads
installed :  N
```

N = number of pumps (or other loads) installed belonging to GROUP B.
This number, from 2 to 3, represents the number of pumps installed irrespective of whether or not they are used.

M 4.2
```
Number of loads
simultaneous: M
```

M = number of pumps to be switched on simultaneously: this is essentially the number of pumps which have to operate in parallel, under normal conditions.
This number goes from 1 to 3; if 1 is selected this means that one pump at a time has to be in operation and the sequence involves sequencing all the pumps installed, switching them on, however, one at a time.

15.2 Settings regarding the inputs for general control

M 4.3
```
Input Enabling
  On = CLOSED
```

The enabled input is the general control which permits switching on the pumps system; e.g. the control of circulation pumps by a compensating controller.
This input can be:
On = CLOSED: controls the pumps when the switch is closed (switch open = OFF)
On = OPEN: controls the pumps when the switch is opened (switch closed = OFF)
ANALOGUE: the input is converted from a switch to a 0…10 V input; the number of pumps switched on at the same time goes from 0 to M in proportion to the value of the input in volts, with a certain hysteresis value in order to avoid too many on and off switchings.
With 0 volts no pump is switched on; with 10 volts M pumps are switched on..

M 4.4
```
Delay ON :  XXm
Delay OFF:  XXm
```

On this page you can program the delay when switching ON and OFF, at the enabling input of the pumps (M4.3). This page exists only if the input is not ANALOGUE

15.3 Settings regarding the sequence

M 4.5

```
Change sequence
every:XXX days
```

Enter the number of days after which a new sequence of pumps is started
Example: with N = 3 and M = 2 the sequences will be 1 + 2, 2 + 3, 3 + 1, 1 + 2 and so on; the change will take place after the number of days entered.

M 4.6

```
Time of sequence
change: XX.XX
```

You can set the time of day at which the sequence change takes place in order to avoid, for example, noise during the night of the contactors tripping or the start up of the pumps..

15.4 Control inputs regarding the individual pump

Each single pump installed can be provided with two service controls so as to know at any moment its operational status and consequent availability.
THERMAL OVERLOAD RELAY= the auxiliary switch of the pump contactor; this relay trips if the supply current to the pump should exceed a certain level and signals this event.
When the switch is On (relay tripped) the pump is excluded from the sequence and replaced by another available one.
Clearly, this switch can be used even without the contactor, in order to exclude at certain times a particular pump.CONFIRMATION FUNCTIONS = usually the pump flow switch or any other device that can confirm that the pump is functioning after it has been switched on.
Since the flow switch can send this confirmation only after the pump has been switched on, it is first necessary to send the signal to switch on, wait for the programmed delay (M2.11) and check the confirmation by the presence of the flow.
In the event of unreceived confirmation a second attempt is made, after which the pump is considered unavailable (defective) and is excluded from the sequence.
(The "**unreceived confirmation**" status is indicated on the display by the flashing symbol Cf (M0.1...6).
When operation re-starts the pump will be again inserted in sequence, but only at the next programmed sequence change (if its insertion is included in the new sequence). The immediate re-insertion of the pump is possible only by using the Manual Sequence (M0.7) control: sending a new sequence which includes the pump then available .
IPG 658 C1 constantly checks that the confirmation status is consistent with the status of the respective output: Output On = confirmation On.
In the event of inconsistency: Output Off = confirmation On, it presumes that the pump is switched on from outside and can no longer be controlled solely by IPG 658 C1 and, as in the event of unreceived confirmation, sends an **external confirmation** alarm and excludes the pump from future sequencing programs.
The pump will be reintegrated in the sequences and controlled again by IPG 658 C1 only when the external confirmation status ceases..

M 4.7

```
ThermalOL relays
  On = CLOSED
```

On = CLOSED: the tripping of the thermal overload relay results in **a closing** auxiliary switch of the contactor which signals the **non-availability** of the pump.
On = OPEN: the tripping of the thermal overload relay results in **an opening** auxiliary switch of the contactor which signals the **non-availability** of the pump.
UNUSED: the contactor is not used, or the auxiliary switch is not available.

M 4.8

```
ConfIrmOperating
  On = CLOSED
```

On = CLOSED: the tripping of the flow switch results in **a closing** switch which signals **the operation** of the pump.
On =OPEN: the tripping of the flow switch is represented by **an opening switch** which signals **the operation** of the pump.
UNUSED: the contactor is not used, or the auxiliary switch is not available.

M 4.9

```
Delay confirming
operation XXXsec
```

The delay, in seconds, to allow the flow switch to trip after the pump is switched on and to send to IPG 658 C1 the signal confirming that the pump is in operation.

15.5 Maintenance of the pumps and control alarms

M 4.10...12

```
Maintenan.load 1
after: XXXXX h
```

For each single pump you can program the number of operating hours after which it has to undergo maintenance.
Exceeding this number of hours triggers an alarm which can be sent Telematically to the system supervisor.

You can decide if the triggering of a thermal overload relay, or the unreceived confirmation from the flow switch is to trigger an alarm in order to know, Telematically if required, the existence or not of an anomaly.

M 4.13

```
Alarm ThOLR :YES
AlarmConfirm: NO
```

An alarm is sent also for a pump momentarily not in operation.
In the event of an alarm for the presence of confirmation (the pump is managed manually from outside) the pump will be excluded from the subsequent attempts to re-start it, until the status of external confirmation has ceased.

16. USE AND NORMAL CONTROL

These controls change depending on whether you are working with SINGLE GROUP or with GROUP A + GROUP B

16.1 Use and normal controls with SINGLE GROUP

M 0.2...6

```
----------: N.1
AUTOMATIC     Mn
```

There are as many of these pages as there are pumps installed (M2.1)
The pumps can be controlled in various ways:
AUTOMATIC = the pump is switched on when it is included in the sequence operating at that moment.
ALWAYS ON = the pump is always switched on even if not in the sequence; it counts as a switched on pump in the number of the pumps desired to be switched on at the same time (M2.2).
ALWAYS OFF = the pump is always off and is considered as if non-existent; useful when, for example, the pump is in maintenance.

Mn = appears flashing only if the pump has exceeded the number of hours before maintenance is due (page M2.12...16)
Th = appears flashing in place of Mn only if the thermal overload relay alarm is in progress or if both the thermal overload relay alarm and the flow switch alarm are in progress.
Cf = appears, flashing, in place of Mn only if the confirmation alarm is in progress.
The confirmation alarm can be of two kinds :
– Unreceived confirmation, if the output is On but the confirmation is not
– External confirmation, if the output is Off but the confirmation is On

M 0.7

```
Seq :AUTOMAT.
1– 2– 3– 4– 5–
```

This is the page that indicates the sequence taking place at that moment, and the status of all the pumps, so as to have an overall view of the system.
AUTOMAT = the sequence is completely automatic. The first boiler in the sequence is highlighted by an underlining, whilst the pumps which are switched on are indicated by the rotation of a dash near the number. Clearly, if the pump does not exist, nor does the corresponding number.
For all the other indications please see page M0.7 of the general explanation.
MANUAL = you can block a certain sequence without having the automatic change after the number of days set on page M2.7.
The first pump of the sequence can be changed using + and – keys.
OFF = the system is switched off; also the pumps programmed "**ALWAYS ON**" are switched off..

16.2 Use and normal controls with system GROUP A + GROUP B

M 0.8...9

```
---------- 1GrA
AUTOMATIC     Mn
```

M 0.10

```
Seq  AUTOMAT
1– 2–    Group A
```

M 0.11...13

```
---------- 1GrB
AUTOMATIC     Mn
```

M 0.14

```
Seq  AUTOMAT
1– 2– 3– Group B
```

Operation with GROUP A + GROUP B is exactly the same as that of SINGLE GROUP and refers to 2 independent GROUPS of pumps; all the programs are also independent.

17. MEASUREMENTS AND COUNTS

A certain number of pages have been assigned for all the measurements and counts of the system and will always appear in relation to SINGLE GROUP or GROUP A + GROUP B..

M 0.15

```
Input enabling
analogue: XXX%
```

The value of the 0...10 V analogue input expressed as a percentage from 0 to 100% (SINGLE GROUP); if GROUP A + GROUP B there will be two corresponding pages.

M 0.18

```
Days to change
sequence     :XXX
```

The "count down" of the days to go before the change of sequence (SINGLE GROUP); if GROUP A + GROUP B there will be two corresponding pages.

M 0.21

```
Inputs
7 8 9 10 11 12
```

The status of the inputs which are converted to alarm for general use, when in the SINGLE GROUP the pumps number less than 5 (page M1.2)

M 0.22...26

```
----------: N.1
Operat hrs:XXXXX
```

The operating hours totalled by the individual pumps; the display flashes if the hours exceed the number set on page M2.12...16 (SINGLE GROUP) or on the corresponding pages of GROUP A and of GROUP B.

M 0.27

```
Hours at least 1
load ON :  XXXXX
```

On this page are shown the hours for which at least one pump of SINGLE GROUP has remained On; you can therefore know the time during which the system has been in operation, even if at minimum. Similar pages if GROUP A + GROUP B.

M 0.36

```
BST:  AUT
Fr XX.XXto XX.XX
```

AUT = BST starts during the night between the last Saturday and the last Sunday in March and ends during the night between the last Saturday and the last Sunday in October.
MAN = the dates for the start and end are set as required.

18. COMPLEMENTARY FUNCTIONS

18.1 Access keynumber

M1.7

```
Choice keynumber
      ----
```

Choice of enabling access keynumber. Prevents the use of + and – keys and so any alterations to data. Enter the number (1900…1999) using + or – keys.
To cancel the keynumber press + and – at the same time until the dashes reappear.

```
Access keynumber
      ----
```

When the code is enabled, if you press + or – keys, on the display appears the request to enter this code; only after having keyed in the code correctly can you use + and – keys.
If for 15 minutes no key is pressed the code is automatically re-activated

18.2 Denomination of site and outputs

M1.8

```
Name site
----------------
```

Entering name of site which appears on first page of display.
Using + and – keys, each dash can be replaced by a letter of the alphabet (A…Z) or by a number (0…9). The ← and → keys serve to position the cursor.

M2.18 - M3.14 - M4.14

```
Nome of loads
   -----------
```

The same name must be entered for all the loads (e.g. pump) which have to be put in sequence.
These are the names which appear on pages M0.2...0.6 or the like.
Each dash can be replaced, using + and – keys, by a letter of the alphabet (A…Z) or by a number (0…9). The ← and → keys serve to position the cursor.

19. TESTING

M 5.1...5

```
Output N.1
Control=OFF
```

This page appears only if the input has been programmed as ANALOGUE.
With the programming as GROUP A + GROUP B there will be two of these pages, regarding the 2 GROUPS.
With + and – keys you can simulate a value between 0 and 100% in order to check the sequencing of the pumps which have to be switched on at the same time (M2.2):
0 = no pump
100 = all the pumps must be switched on at the same time.
If the control SL is enabled, the pumps switched on will be the number set by the SL control (M2.3 only SINGLE GROUP).

M 5.6

```
Simulation input
analogue : XXX %
```

The simulation of the analogue input is a true simulation of site operation.
Accordingly, it takes into account also the status of the service controls: thermal overload relays and confirmation (if configured for use); checks the switching off of the thermal overload relay and the return of confirmation when the pumps are switched on.

M 5.9

```
Simulation alarm
Enabling=     OFF
```

Enabling = ON: the control of an alarm is simulated to check for a possible connection of a local signaller relay (terminals 13 and 14) of the general alarm.

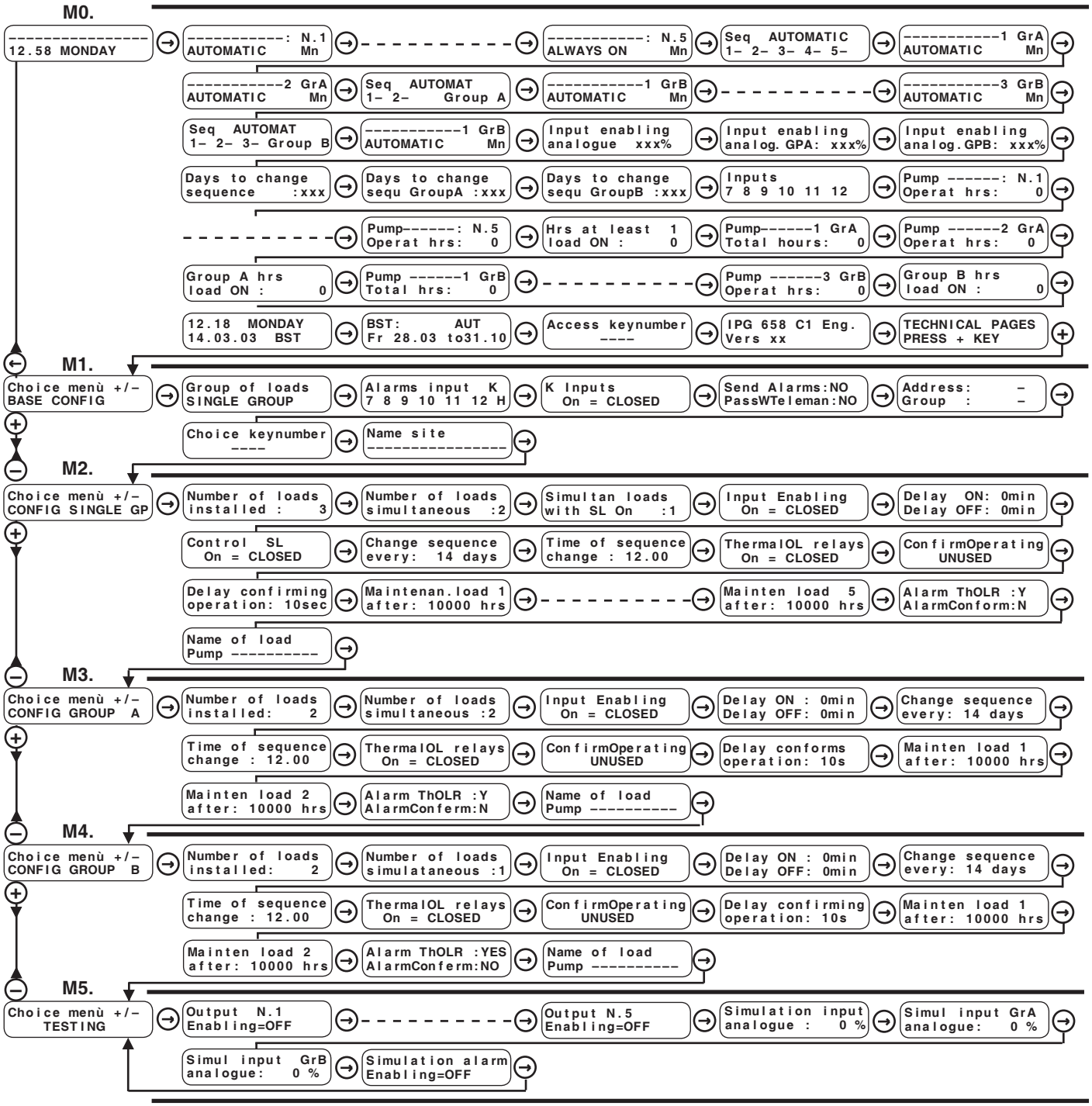
20. RECORDER

The recorder records every change in the status of the events to be recorded.
Each event is recorded showing day, date, hour and minute.
By means of the Telemanagement program it is possible to select those elements whose change of status is to provoke a recording. The recorded elements are:

- Status of the outputs
- Status of the thermal overload relays
- Status of the confirmations
- Alarms for servicing loads
- Alarms for K inputs (if available)

It can make 99 complete recordings and the last recording brings about the cancellation of the oldest one.

20. SEQUENCE OF DISPLAY PAGES (the data and functions are factory settings)



⊖ ⊕ Keys for scrolling the display pages and positioning the cursor ▌ on adjustable data on the pages.
IThe adjustable data, in the following descriptive list of display pages, are highlighted thus
Premendoli contemporaneamente o comunque dopo 15 minuti si ritorna alla prima pagina

---------- 12.58 MONDAY

⊖ ⊕ Keys for : – adjusting the values indicated by the cursor ▌
– viewing the possibility of configuring a function, e.g. InputAgreement : Input Enabling ON = C LOSED or Input Enabling On = O PEN
– passing directly from one menu (series of pages) to another.

M0. NORMAL USE

Ref.	Display	Description	Notes	Sect.
M0.1	---------------- 12.58 MONDAY	Name site. Current time and day.	Set in **M 1.8** Set in **M0.35**	
M0.2 ⇓ ⇓ M0.6	Pump ------ N.1 AUTOMATIC Mn Pump ------ N.5 AUTOMATIC Mn	Name device controlled e.g. PUMP AUTOMATIC = follows the automatic sequences ALWAYS ON = On even if not in sequence ALWAYS OFF = Off even if in sequence Mn flashing = pre-set countdown hours for maintenance reached. Pages which appear only if SINGLE GROUP.	Set in **M2.18** SINGLE GROUP The number of pages equals the number of pumps installed. In place of Mn appear: TI flashing if thermal overload alarm in progress or thermal overload + confirmation.Cf flashing if in progress only confirmation alarm.	**16.1**
M0.7	Seq AUTOMAT 1– 2– 3– 4– 5–	AUTOMAT = automatic sequence AUTOMAT.SL = control On for changing the simultaneous pumps. MANUAL = sequence controlled manually; first pump in sequence set by + and – keys. The pump in sequence is that indicated by an underlining e.g. 3 (only in automatic sequence). OFF = whole system Off.	If SINGLE GROUP Normal number without – = pump available, but at that moment not in sequence. Normal number with – rotating = pump available & in sequence, or always On. Number without – intermittent to C=pump unavailable because of lack of confirmation. Number with – rotating, intermittent to C = pump unavailable because not controlled by IPG 658 C1 (external confirmation). Number without – flashing to T = pump unavailable because of thermal o/l relay. Number inexistent = pump inexistent. Number alternating with E = pump excluded from the sequence (always On or always Off).	**16.1**
M0.8 ⇓ ⇓ M0.9	Pump ------1 GrA AUTOMATIC Mn Pump ------3 GrA AUTOMATIC Mn	Name of device controlled e.g. PUMP Purpose as for page **M 0.2 ...0.8**	Set in **M3.13** GROUP A The number of the pages is equal to the number "N" of the pumps installed in the GROUP A (2).	**16.2**
M0.10	Seq AUTOMAT 1– 2– Group A	Same modality as **M0.7** for the two pumps of GROUP A	If **M 1.1** = GROUP A + B	**16.2**
M0.11 ⇓ ⇓ M0.13	Pump ------1 GrB AUTOMATIC Mn Pump ------3 GrB AUTOMATIC Mn	Same modality as **M0.8...0.9** for the two or three pumps of GROUP B	Set in **M 4.14** GROUP B	**16.2**
M0.14	Seq AUTOMAT 1– 2– 3– Group B	Same modality as **M0.8...0.9** for the two or three pumps of GROUP B	If **M 1.1** = GROUP A + B	**16.2**
M0.15	Input enabling analogue: 0%	Appears only if **M 2.4** = ANALOGUE 0...10 V	If **M 1.1** = SINGLE GROUP	**17**
M0.16	Input enabling analog GPA: 0%	Appears only if **M 3.3** = ANALOGUE 0...10 Volt.	If **M 1.1** is GROUP A + B	
M0.17	Input enabling analog GPB: 0%	Appears only if **M 4.3** = ANALOGUE 0...10 Volt.	If **M 1.1** is GROUP A + B	
M0.18	Days to change sequence : 14	The number of days to go to the end of the current sequence (count down).	If **M 1.1** is SINGLE GROUP	**17**
M0.19	Days to change sequ GroupA : 14	The number of days to go tore the end of the current sequence (countdown).	If **M 1.1** is GROUP A + B	
M0.20	Days to change sequ GroupB : 14	The number of days to go to the end of the current sequence (countdown).	If **M 1.1** is GROUP A + B	
M0.21	Inputs 7 8 9 10 11 12	The numbers have the following significance: Non-existent number = input occupied by the pump Small number = status or alarm OFF Large number = status ON Large number alternating with A = alarm ON	Only if **M 1.1** is SINGLE GROUP and the number of pumps installed is less than 5 (M2.1)	**17**

M0. NORMAL USE

Ref.	Display	Description	Notes	Sect.
M0.22 ⇓ ⇓ M0.26	Pump ------: N.1 Operat hrs : 0 … Pump ------: N.5 Operat hrs : 0	Name of device controlled e.g. PUMP XXXXX = total operating hours of the single pump from last zero setting after any maintenance; the second line is intermittent if the hours are greater than the pre-set count. By pressing + and – keys at same time the counts are cancelled.	If **M 1.1** = SINGLE GROUP The number of the pages is equal to the number of pumps installed. Range: 0…99999 hours	17
M0.27	Hrs at least 1 load ON : XXXXX	XXXXX = operating hours with at least one pump running	If **M 1.1** = SINGLE GROUP	17
M0.28 ⇓ ⇓ M0.29	Pump ------1 GrA Total hours : 0 Pump ------2 GrA Operat hrs : 0	Name of device controlled e.g. PUMP Same as SINGLE GROUP. There are 2 counters (2 pumps for GROUP A)	If **M 1.1** = SINGLE GROUP	17
M0.30	Group A hrs load ON : 0	The operating hours with at least one device switched on..	If **M 1.1** = GROUP A + B	17
M0.31 ⇓ ⇓ M0.33	Pump ------1 GrB Total hours: 0 Pump ------3 GrB Operat hrs: 0	Name of device controlled e.g. PUMP Same as SINGLE GROUP. There are 2/3 counters (GROUP B)	If **M 1.1** = GROUP A + B	17
M0.34	Group A hrs load ON : 0	The operating hours with at least one device switched on.		
M0.35	12.18 MONDAY 14.03.03 BST	Entering time and date		
M0.36	BST: AUT Fr 28.03 to 31.10	Change from GMT to BST with dates		17
M0.37	Access keynumber -----	Appears when + or – keys pressed if a value has been entered in **M1.7**	.	18.1
M0.38	IPG 658 C1 Eng. Vers.xx	Identiyfying data for controller		
M0.39	TECHNICAL PAGES PRESS + KEYS	.		

M1. BASE CONFIG (BASIC CONFIGURATION

Rif.	Display	Descrizione	Note	Cap.
M1.1	Group of loads SINGLE GROUP	SINGLE GROUP = up to 5 pumps GROUP A + GROUP B = 2 groups GROUP A = 2 pumps; GROUP B = 2/3 pumps	Default SINGLE GROUP	12.1
M1.2	Alarms input K 7 8 9 10 11 12 H	– = Respective alarm not required Number or letter which alternates with A = alarm triggered. H = clock alarm. By default, all switched off except “H” alarm which always On & cannot be disabled..	With SINGLE GROUP = 7 – 12 are the alarm inputs when N is less than 5; do not appear if not available. With group A + B all the alarms disappear except H alarm.	12.2
M1.3	K inputs On = CLOSED	Decide if you want the K inputs (when there are less than 5 pumps) to be On when the switch is CLOSED or OPEN.	If **M 1.1** = GROUP A + B. If SINGLE GROUP with 5 pumps or GROUP A + B this page disappears..	12.2
M1.4	Send Alarms: NO PassWTeleman.: NO	Triggering alarms to send to Telemanagement PC. Switching on PassWTeleman.	To adjust use + and – keys Only if connected in C-Bus	9.3
M1.5	Address: – Group : –	Telemanagement address of IPG 658 C1 Group to which assigned	To adjust use + and – keys. Range 1…239. Only if connected to C-Bus.	9.2
M1.7	Choice keynumber ----	Access code with the same standard Coster features: prevents use of + and – keys.	To disable the keynumber press + and – keys at same time.	12.3 18.1
M1.8	Name site ----------	Enter site name		18.2

M2. CONFIG SINGLE GP (CONFIGURATION SINGLE GROUP) (if M1.1 is SINGLE GROUP)

Ref.	Display	Description	Notes	Sect.
M2.1	Number of loads installed: 3	Total number of pumps installed (2 to 5) irrespective of whether available or not..	Default = 3 pumps	13.1
M2.2	Number of loads simultaneous: 2	Number of pumps you wish to operate simultaneously (1 to 5) under normal conditions: that is without SL (E2) input being On. .	Default = 2 SL = digital input for changing number of pumps switched on at same time with SINGLE GROUP.	13.1
M2.3	Simultan loads with SL On :1	Number of pumps you wish to operate simultaneously (1 to 5) when SL input is On.	Does not appear if **M2.6** = UNUSED Default = 1	13.1
M2.4	Input Enabling On = CLOSED	Input for agreement to enabling sequence CG (E1). CLOSED = agreement On with switch closed OPEN = agreement On with switch open ANALOGUE = input 0…10 V to switch on pumps in sequence	Default = CLOSED	13.2
M2.5	Delay ON : 0m Delay OFF: 0m	Delay switching On and switching Off desired for general agreement of pumps	This page does not appear if **M2.4** is ANALOGUE. Range: 0…99 minutes	13.2
M2.6	Control -SL- On = CLOSED	SL (E2) is the external control for changing the number of pumps switched on at the same time. CLOSED = On with switch closed OPEN = On with the switch open UNUSED = function not used		13.2
M2.7	Change sequence every: 14 days	Number of days after which sequence is changed.	Default 14 days (2 weeks) Range: 1…250 days	13.3
M2.8	Time of sequence change : 12.00	Time at which sequence is changed.	Default : 12.00	13.2
M2.9	ThermalOL relays On = CLOSED	CLOSED = closing switch used when thermal overload relay trips. OPEN = opening switch used when thermal overload relay trips. UNUSED = thermal overload relay not used.a	Default = CLOSED	13.4
M2.10	ConfirmOperating UNUSED	CLOSED = switch used which closes when flow meter gives confirmation of flow OPEN = switch used which opens when flow meter gives confirmation of flow UNUSED = The flow meter not used.	Default = UNUSED	13.4
M2.11	Delay confirming operation 10s	Wait time before checking if flow meter has tripped or not at switching on (and at switching off) of relative pump.	Default = 10 seconds Does not appear if **M2.10** = UNUSED Range: 0…999 seconds	13.4
M2.12 ⇓ ⇓ M2.16	Maintenan.load 1 after:10000 hrs Maintenan.load 1 after:10000 hrs	Hours of operation after which alarm warning for maintenance of individual pumps. Number of pages displayed depends on number of pumps installed in **M 2.1**.	Range: 0…99999 hours By pressing + and – keys at same time the hours are cancelled, dashes appear and the alarm is disabled.	13.5
M2.17	AlarmThOLR : Y AlarmConfirm: N	You can decide if or not you want to trigger an alarm when a thermal overload relay trips or for unreceived confirmation from a flow switch	The lines “Thermal overload relay” and “Confirmation” do NOT appear if on pages **M2.9** and **M2.10** “UNUSED”is indicated. The letter “A” alternates with “YES” when the alarm has been triggered.	13.5
M2.18	Name of load PUMP ----------	Enter name of device to put into sequence.	Default = PUMP	18.2

M3. CONFIG GROUP A (CONFIGURATION GROUP A) (if M1.1 is GROUP A + GROUP B)

Rapid flashing LEDs U1, U2 indicate operations on GROUP A

Rif.	Display	Description	Notes	Cap.
M3.1	Number of loads installed: 2	Total number of pumps installed (always 2) independently of whether available or not..	This page is shown only for completeness	14.1
M3.2	Number of loads simultaneous :2	Number of pumps you wish to operate simultaneously (1 to 2)	If 1 is a pump which exchanges with another. If 2 are both switched on and there is no sequence because GROUP A consists of 2 pumps.	14.1
M3.3	Input Enabling On = CLOSED	The input for general enabling of sequence for GROUP A **ESG** (E1). CLOSED = enabling On with switch closed OPEN = enabling On with switch open ANALOGUE = input 0…10V to switch on pumps in steps.	Default = CLOSED	14.2
M3.4	Delay ON : 0m Delay OFF: 0m	The delay switching ON and OFF desired for general enabling of the pumps	This page does not appear if **M3.3** is ANALOGUE. Range: 0…99 minutes	14.2
M3.5	Change sequence every: 14 days	Number of days after which sequence changes.	Default 14 days (2 weeks) Range: 1…250 days	14.3
M3.6	Time of sequence change : 12.00	Time at which sequence changes	Default = 12.00	14.3
M3.7	ThermalOL relays On = CLOSED	CLOSED = closing switch used when thermal overload relay trips OPEN = opening switch used when thermal overload relay trips UNUSED = thermal overload relay not used	Default = CLOSED	14.4
M3.8	ConfirmOperating UNUSED	CLOSED = closing switch used when flow switch confirms flow OPEN = opening switch used when flow switch confirms flow UNUSED = thermal overload relay not used	Default = UNUSED	14.4
M3.9	Delay confirming operation 10s	Wait time before checking if flow switch has tripped or not at switching on (and switching off) of relative pump.	Default: 10 seconds Page does not appear if **M3.8** = UNUSED Range: 0.999 seconds	14.4
M3.10 ⇓ ⇓ M3.11	Maintenan.load 1 after:10000 hrs Maintenan.load 1 after:10000 hrs	Number operating hours after which alarm required to warn maintenance due for individual pumps. The number of pages displayed depends on number of pumps installed in **M2.1**	Range: 0…99999 hours By pressing + and – keys at same time the times are cancelled, dashes appear and alarm is disabled..	14.5
M3.12	Alarm ThOLR : Y AlarmConfirm : N	Decide if or not if you wish to trigger an alarm when a thermal overload relay trips or for unreceived confirmation from flow switch.	The lines “Thermal overload relay” and “Confirmation” do not appear if on pages **M3.7** and **M3.8** is indicated “UNUSED”. The letter “A” alternates with “YES” when the alarm has been triggered..	14.5
M3.13	Name of load PUMP ----------	Enter name of device to put in sequence.	Default = PUMP	18.2

M4. (CONFIG GROUP B) CONFIGURATION GROUP B (if M1.1 is GROUP A + GROUP B)

Rapid flashing LEDs U3, U4 & U5 to indicate now operating on GROUP B

Rif.	Display	Descrizione	Note	Cap.
M4.1	Number of loads installed: 2	Total number of pumps installed (can be 2 or 3) irrespective of whether available or not.	Default = 2	15.1
M4.2	Number of loads simultaneous : 1	Number of pumps wished to operate simultaneously (1 to 3)	Default = 1	15.1
M4.3	Input Enabling On = CLOSED	The input for general enabling for executing sequence for GROUP B **EGA** (E2). CLOSED = agreement On with switch closed OPEN = agreement On with switch open ANALOGUE = 0…10V input to switch on the pumps in steps	Default = CLOSED	15.2
M4.4	Delay ON : 0m Delay OFF: 0m	Delay in switching ON and OFF desired for general agreement for the pumps	This page does not appear if **M4.3** is ANALOGUE. Range: 0…30 minutes	15.2
M4.5	Change sequence every: 14 days	Number of days after which sequence changed.	Default: 14 days (2 weeks) Range: 1…250 days	15.2
M4.6	Time of sequence change : 12.00	Time at which sequence changes	Default = 12.00	15.3
M4.7	ThermalOL relays On = CLOSED	CLOSED = uses switch closing when thermal overload relay trips. OPEN = uses switch opening when thermal overload relay trips. UNUSED = thermal overload relay not used	Default = CLOSED	15.4
M4.8	ConfirmOperating UNUSED	CLOSED = switch used which closes when flow switch confirms flow. OPEN = switch used which opens when flow switch confirms flow. UNUSED = no flow switch used.	Default = UNUSED	15.4
M4.9	Delay confirming operation 10sec	Wait time for checking if flow switch has tripped or not, at switching on and off of relative pump.	Default = 10 seconds Does not appear if **M4.8** = UNUSED Range 0...999 seconds	15.4
M4.10 ⇓ M4.12	Maintenan. load 1 after:10000 hrs Maintenan. load 1 after:10000 hrs	Number operating hours after which alarm triggered as warning to carry out maintenance of individual pumps. The number of pages displayed depends on number of pumps installed in **M 2.1**.	Range: 0…99999 hours Press + and – keys at same time to cancel the hours: dashes will appear and the alarm is disabled..	15.5
M4.13	AlarmThOLR : Y AlarmConfirm: N	You can establish if you want to trigger an alarm when a thermal overload relay trips or if no confirmation from the flow switch.	The lines “Thermal overload relay” and “Confirmation” do NOT appear if on pages **M4.7** and **M4.8** is indicated “UNUSED””.	15.5
M4.14	Name of load PUMP ----------	Enter name of device to be put in sequence	Default = PUMP	18.2

M5. TESTING

Ref.	Display	Description	Notes	Sect.
M5.1 ⇓ ⇓ M5.5	Output N 1 Enabling = OFF Outut N.5 Enabling = OFF	Control for testing pump number (1 to 5). This control is not subject to any limitation (Thermal overload relay or flow switch) to be able to check the control wiring of the pump.	.	19
M5.6	Simulation input analogue : 0 %	Simulation of analogue input, if it exists, in order to check the sequencing of the pumps.	Appears only if page **M1.1** is SINGLE GROUP and if **M2.4** is ANALOGUE. Campo 0...100 %	19
M5.7	Simul input GrA analogue : 0 %	Simulation of analogue input, if it exists, to check the sequencing of the pumps .	Appears only if on page **M 1.1** is GROUP A + GROUP B and if **M 3.3** is ANALOGUE. Range 0...100 %	
M5.8	Simul input GrB analogue: 0 %	Simulation of analogue input, if it exists, to check sequencing of the pumps.	Appears only if on page **M 1.1** is GROUP A + GROUP B and if **M 4.3** is ANALOGUE. Range 0...100 %	
M5.9	Simulation alarm Enabling: OFF	Simulation of a general alarm to test output of alarm relay (U6).	.	19

Amendment to data sheet

Date	**Revision No.**	Page	Section	Details of amendment	Firmware version	Software version
19.09.07 LB	**01**	All	All	New C1 version	≥ 06	> 0.98.2295

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