newel 2
Electronic System Developed by DIGITEL

User Manual

INTRODUCTION

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1. Introduction

NEWEL 2 represents a new generation of control systems for refrigeration installations. As the fruit of close collaboration between DIGITEL and professionals in the refrigeration industry, NEWEL 2 incorporates all the advantages of the NEWEL range, well-established on the market since 1990, and delivers numerous improvements in terms of flexibility, functional capability and reliability.

2. Basic concept

The *NEWEL 2* system is comprised of *one or more control units*, which are completely independent of each other.

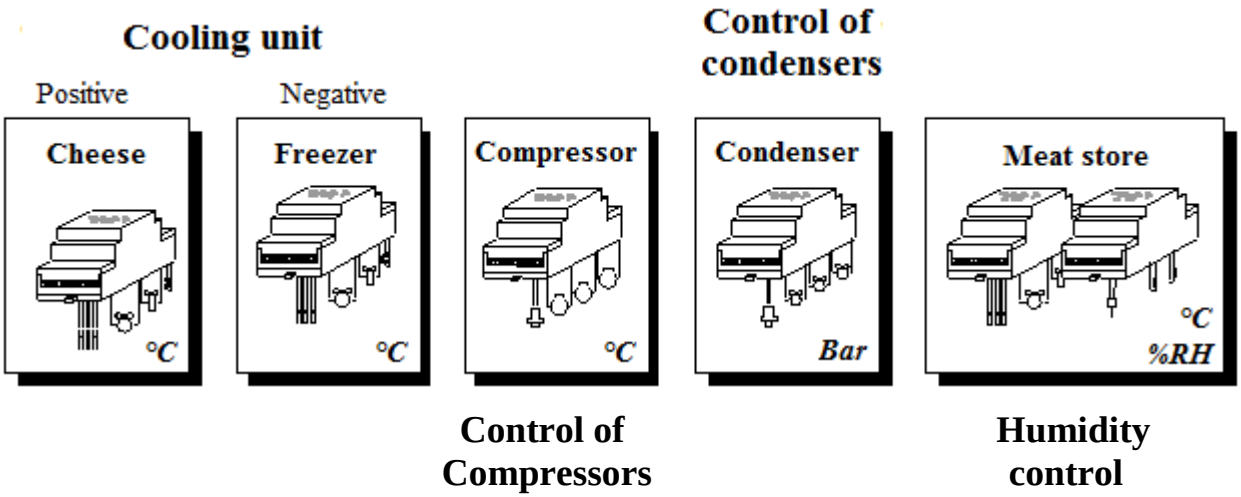
The range consists of universal DI24 modules mounted in two different types of housing:

DI24D:	In a DIN housing
DI24E:	In a plug-in housing

The DI24 modules will fulfill instrument, monitoring and control functions for the regulating devices concerned (solenoid valve, defrosting system, fans, compressors, etc.).

These modules can assume an extremely wide variety of functions, specifically:

- control functions for cooling units
- management of the electronic pressure reducer
- humidity control
- management of compressor units
- management of condensers
- other functions for specific applications (storage of fruits and vegetables, regulation of O_2 – CO_2, etc.)



The module can be programmed using the keys on the front panel of the housing, or using a computer, if the system is equipped with a remote management function. The integral display will indicate the variables, measured by connected probes, and is used for the programming of parameters.

3. ***Product range***

The following table summarizes the functions and characteristics of the various DI24 modules at a glance.

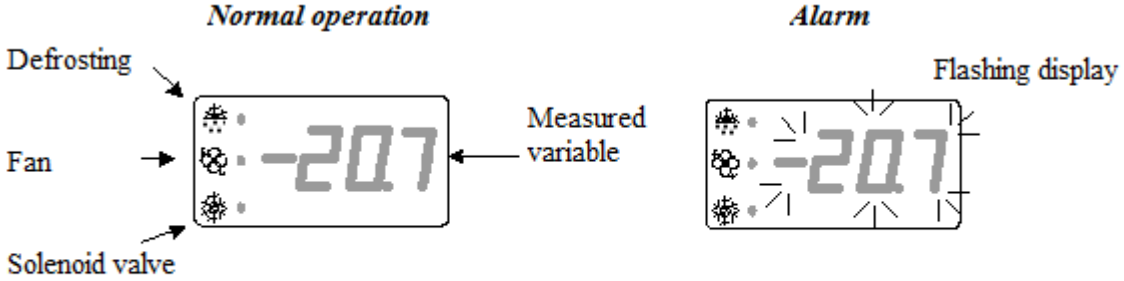
	Ref.	Applications						Characteristics											
		Cooling unit							Entrées			Sorties		Alim.					
		positive	negative	Gestion de la centrale	Hygrométrie	Surveillance	Autres	Afficheur bleu	PT1000	4-20mA	TOR	Relais	Analogique	230VAC	9-24VAC/DC	Bornier embr.	Interface bus télésurveillance	Horloge	Electronique pressure reducer
	DI24E-2H	x						x	1		2	2	1		x	x		x	
	DI24E-4H	x	x	x	x	x	x	x	3	1	2	4	1		x	x		x	
	DI24E-2	x						x	1		2	2	1		x	x	x	x	
	DI24E-4	x	x	x	x	x	x	x	3	1	2	4	1		x	x	x	x	
	DI24EE-5	x	x			x	x	x	4	0-10V	2	4	1		x	x	x	x	x
	DI24D-2H	x						x	1		2	2	1	x		x		x	
	DI24D-4H	x	x	x	x	x	x	x	3	1	2	4	1	x		x		x	
	DI24D-2	x						x	1		2	2	1	x		x	x	x	
	DI24D-4	x	x	x	x	x	x	x	3	1	2	4	1	x		x	x	x	
	DI24DE	x	x			x	x	x	3	0-10V	2	4	1	x		x	x	x	x
	DI24X	x	x	x	x	x	x		3	1	2	4	1	x		x	x	x	

The main differences between the two universal modules are summarized in the following table:

DI24E	**DI24D**
The module is embedded into the front panel of a cabinet, incorporated into a display window, etc.	The module is mounted on DIN rails The module may be fitted in a cascade arrangement with CAB- DI24
The power supply ranges from 9 – 24 V, a.c. or d.c.	The module is supplied with 230 V a.c.
Wires are connected by means of plug-in connectors	Wires are connected by means of plug-in connectors

The DI24D unit is available with or without a display unit fitted to the housing.

4. ***Module display***



5. Programming of parameters using keys

Figure 2 shows an example of the programming diagram applied for the parameterization of modules using the programming keys. The appropriate version of this diagram will be found in the corresponding user manual for the mode of operation which is to be assigned to the programmed module. For example, for the parameterization of a module for the management of a cooling unit, the diagram found in the manual entitled "Management of cooling units" should be applied.

	Symbol	Access level	Function	Comment	Min. value	Max. value	User value
	NONE	0	Password		0	999	
Ambient temperature	t1	1	Setpoint (°C)		-999	999	
	t2	2	Delta (°C). The device can regulate between temperatures t1 and t1+t2		0	999	
	t3	3	Lower setting limit of setpoint (°C)		-999	999	
	t4	3	Upper setting limit of setpoint (°C)		-999	999	
	t5	2	Lower alarm limit (°C)		-999	999	
	t6	2	Upper alarm limit (°C)		-999	999	
	t7	2	Alarm delay (min)		0	999	
	t8	2	Setpoint offset (°C)		-999	999	
	t9	2	Start of setpoint offset (HH:M)		0	240	
	t10	2	End of setpoint offset (HH:M)		0	240	
	t11	3	Minimum operating time (min)		0	999	
	t12	3	Minimum resting time (min)		0	999	
Fans	v1	2	Operation of fan *0 = tripped during defrosting* *1 = continuously in-service* *2 = controlled by valve* *3 = controlled by evaporator probe*		0	3	
	v2	2	Fan start-up temperature (°C)	v1 = 3	-999	999	
	v3	2	Fan trip temperature (°C)	v1 = 3 [Parameter applied only where v1 = 3]	-999	999	
	v4	3	Analogue output – temperature corresponding to 0% (°C)		-999	999	
	v5	3	Analogue output – temperature corresponding to 100% (°C)		-999	999	
Contacts C1, C2	F1	3	Operation of contact C1 *0 = alarm upon closing 3 = none* *1 = alarm upon opening* *4 = setpoint offset upon closing* *2 = shutdown of unit 5 = door contact*		0	5	
	F2	2	Alarm delay (min)	F1 = 0, 1, 5 [parameter applied where F1 = 0 or 1 or 5]	0	999	
	F3	2	*0 = deactivated* *1 – 99.9 = delay in the start-up of the compressor/solenoid valve after door closure*		0	999	

5.1 Programming of parameters

- To access parameterization mode, press on  for 3 seconds.
- The display will read NONE, then 0. This means that you are required to enter a password (modules are delivered with all three passwords set to 0)
    - There are three levels of password: the first level, for users, will allow the modification of the setpoint and clock setting, the second level – which is intended for the use of the operating engineer – will provide access to virtually all functions, while the third level, which is reserved for the installer, will allow the complete configuration of the installation.
- Enter your password by pressing on  to increase its value and  to decrease its value, then on  to validate. If the password is accepted, the display will indicate the symbol of the first parameter for 1 second, then its value. If the password is incorrect, repeat the entry operation.
- Press on  to increase and  to decrease the value of a parameter
    - To change the value more rapidly, hold down one of these keys for 3 seconds or more. The display will scroll with increasing speed. As the desired value is approached, release the key, then press a few more times, but briefly, to achieve the exact value.
- Press on  to validate the parameter concerned, then move on to the next parameter.
- To move on to the next parameter without validating, press on  . The display will indicate the symbol of the next parameter for 1 second, then its value.
- To return to the previous parameter, hold down  then press on  until the required parameter is shown.
- Parameters with similar functions will be combined in groups described as menus. Symbols for parameters in the same menu will have the same initial letter.

  To move from one menu to another, press on  for 3 seconds. The various menus will scroll down. Release the key once you have reached the required menu.
- To save changes and quit programming mode, press on  . If no saving operation is completed, parameters will be restored to their previous values.
- If no key is pressed for five minutes, the device will automatically return to normal mode, will delete all changes and restore the previous values of parameters.

Special operations

- In “cooling unit” mode

  It is possible to initiate defrosting by means of an override, by pressing on  and  keys simultaneously for 5 seconds.

- It is also possible to acknowledge an alarm by pressing on  for 3 seconds.

- By pressing the  and  keys simultaneously, you will access the programming mode for the basic configuration (see § 5.2)

Temporary display

During normal operation, the temporary display of various measured variables and the status of various inputs will be possible.

In “cooling unit” mode, pressing briefly on the  key will display the ambient temperature “tA”, while a second depression will call up the evaporator temperature “tb”, then the probe “tC”, the status of the contact “C1” and the status of the contact “C2”. The variable selected will be displayed for 1 minute, then the display will return to its normal status, determined by the value of the parameter **[r2]**.
On the DI24DE and DI24EE modules (electronic pressure reducers), it is also possible to display “P” – the intake pressure, “S” – overheat, and “o” – degree of opening of the pressure reducer.

In “pressure regulation” mode, successive depressions of the  key will call up the display of the following values: “Pb” – pressure in bar, “Pt” – pressure in °C, “S1” – status of safety system n° 1, “S2” – status of safety system n° 2, “S3” – status of safety system n° 3, “C1” – status of contact C1, “C” – status of contact C2.

5.1 Programming of basic configuration

When a module is brought into service, the basic configuration for that module (parameter **[r1]**) must firstly be configured using the method described below. This configuration is comprised of a number of parameters, which will determine the subsequent operation of the module. Specifically, this configuration will determine whether the module is to function as a regulating device for cooling units, or as a regulating device for a condenser, compressors, humidity, etc.
Once these variables have been correctly programmed, active parameters in this mode will be programmed by default, and the module will be operational thereafter. The only other step is to refine the remaining parameters for the optimum operation of your module.

- To access parameterization mode for the basic configuration, hold down the  and  keys simultaneously for 3 seconds.

- The remainder of the programming method is identical to that described above.

- To save changes and quit parameterization mode, press on  for 3 seconds.

The following example shows a compressor regulation function with a display in °C and a coolant fluid R404A.

Symbol	Access level	Function	Comment	Min. value	Max. value	Variable to be programmed
NONE	0	Password		0	999	
R1	3	Operating mode *0 = cooling unit* ***1 = Compressor management*** *2 = Universal regulation 3 = Monitoring* *4 = Management of evaporators 2, 3, etc.*		0	4	1
cF2	3	Type of regulation ***0 = low pressure*** *1 = high pressure*	r1 = 1	0	1	0
cF3	3	Display unit *0 = bar* ***1 = °C***	r1 = 1	0	1	1
cF4	3	Coolant fluid *1 = R12 2 = R22 3 = R134A 4 = R502 5 = R500* *6 = MP39 7 = HP80* ***8 = R404A*** *9 = R717 (NH3)* *10 = chilled water 11 = R407 (fluid) 12 = R407 (gas/fluid) 13 = R23*	r1 = 1	1	13	8

- To access the functional parameterization mode, hold down the  and  keys simultaneously for 3 seconds.
- Re-enter password and press on  . This will call up the operating mode (parameter **[r1]**)
- For compressor management, r1 = 1. Press on 
- This will call up the option for compressors (low pressure) or fans (high pressure). For compressors, cF2 = 0. Press on 
- This will call up the display options. For a display in °C, cF3 = 1. Press on 
- The coolant fluid is the last option. For R404A, cF4 = 8
- Exit programming mode by pressing on  for 3 seconds.

Our module will then be ready for operation with non-default parameters.

☝ If no key is pressed in programming mode for five minutes, the device will automatically return to normal mode, will delete all changes and restore the previous values of parameters.

6. Passwords

NEWEL2 has passwords at three hierarchical levels. The first level authorizes access to an extremely limited number of parameters which can be modified by the owner of the installation who, in general, will not have the necessary expertise for the modification of sensitive data. The second level password will authorize access to all parameters, with the exception of the level 3 password, and will be used by qualified engineers operating on the installation. The option for the changing of passwords on the first and second levels will be available. The level three password authorizes access to all parameters. In principle, this level of password will only be used for the retrieval or modification of a second level password, in case of the loss or inadvertent modification of the latter.

Where a password is set to 0000, access to the corresponding hierarchical level will be unrestricted. To determine the level of access associated with a password entered, the device will complete the operations represented in the organigram in Figure 3.

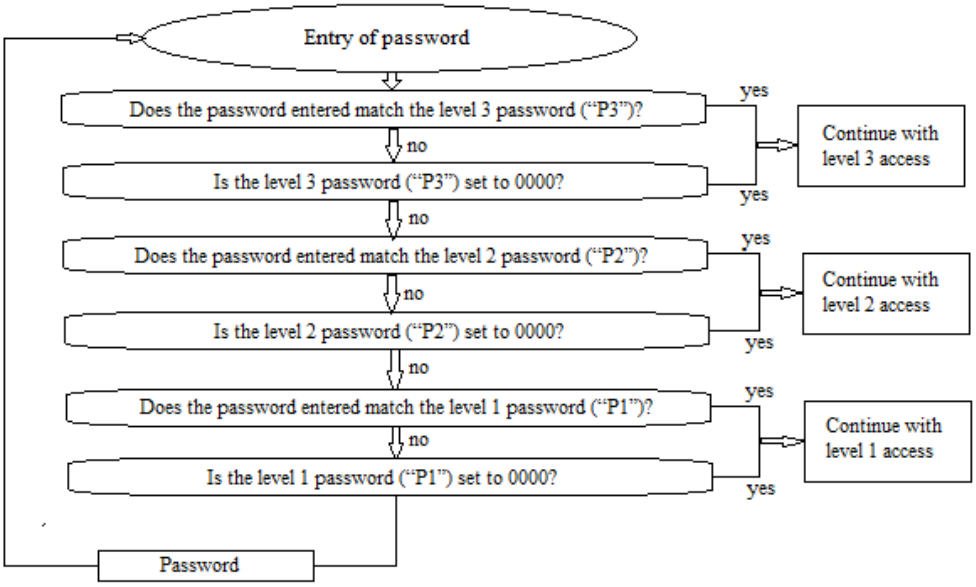


Figure 3 *File: F_Mot de Passe.vsd*

7. Monitoring functions

The device will undertake the continuous monitoring of the installation, and will trigger an alarm in case of the detection of an anomaly. The codes, dates and times of the 5 most recent anomalies will be stored as parameters **[A1C], [A1d], [A1b], [A1H], [A1M], [A2C],** etc. A schedule of anomaly codes and their meanings is included at the end of the programming diagram.

By pressing on the  key for 3 seconds, the alarm will be acknowledged and the alarm contact will open.

8. Remote monitoring, remote management

NEWEL2 may be connected to a remote monitoring system via a DI48 central unit. A device of this type will allow the installer, or any other authorized person, to retrieve information from modules remotely via a telephone line. Communications are managed by a computer (IBM-compatible PC) equipped with "TelesWin" software, which is sold by our company. Full data can be accessed on the current status of the installation (temperatures, humidity, status of inputs and outputs). It will also be possible to undertake the remote modification of all parameters, to instruct an override defrost cycle, shutdown or override operation of a unit, etc.

The central remote monitoring unit also has the capability for the cyclical memorization of all key data concerning the installation (temperatures, humidity, status of inputs and outputs, etc.). The frequency of recording is programmable.

In case of any anomaly or failure, the central unit will automatically dial the telephone number associated with your computer, in order to allow the nature of the fault concerned to be displayed on screen. The priority level of each anomaly will be programmable (see instructions for use for "TelesWin DI48").

140 modules may be connected to a single remote monitoring unit. Further details of remote management may be obtained from the relevant instructions for use.

A LAN and Internet server may be connected to the communication bus. This server will allow the same operations to be executed from a HTML interface (Internet). For further details, please contact your dealer.

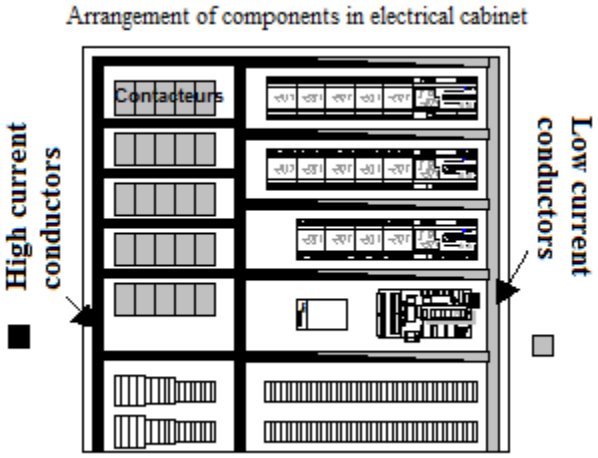
8.1 Weekly schedule

An installation with remote monitoring may be equipped with the "Weekly schedule" option (see instructions for use for "TelesWin DI48").

For installations of the supermarket type, this option will allow the programming of the weekly cycle of store openings and closures, together with the automatic modification of the operation of the installation during periods of closure. These modifications will only affect slave units on which the parameter "Management of unit by weekly schedule" has been set to "Yes" (in the "Schedule" menu).

Depending upon the mode of operation of slave units, modifications to the functioning of the latter during hours of closure may take various forms. These may involve the complete shutdown of the unit, a setpoint offset, lighting and night blind controls, modification to the processing of alarms, etc. (see user manual for the corresponding mode of operation).

9. <u>Important remarks</u>



☹ Devices should not be fitted to elements which are affected by strong vibrations.

☹ Devices should not be positioned in close proximity to a strong source of electromagnetic fields and interference (power cables, speed variator, etc.).

☹ The device must not be exposed to moisture.

☹ The contacts C1 and C2, together with safety contacts for the management of compressors, are zero-potential contacts. No exterior voltage must be applied to these inputs.

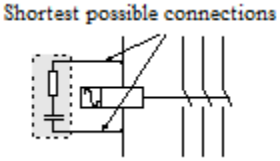
💣 All operations (connection of wires, plugging and unplugging of connectors, etc.) must be completed with the device isolated from supply. All operations must be undertaken by qualified personnel.

💣 Particular attention must be paid to the protection of the communication bus. This must not be exposed to overvoltages associated with connection errors or any induction associated with the proximity of a high current conductor.

💣 For the connection of the communication bus, we recommend a cable of the CAT5 type, or a special RS485 bus cable. In all cases, a single pair of twisted conductors should be used. Any other wires should be left unconnected.

💣 The voltage applied to relay contacts during insulation tests must not exceed 1000 V.

☺ All electrical connections must be checked prior to any connection to supply. Under no circumstances must voltages exceed the values specified in the technical characteristics.



☺ In order to ensure compliance with protection standards for electromagnetic interference and extend the service life of relay contacts, it is recommended that RC filters should be installed in parallel with all inductive loads (coils of contactors, solenoid valves, etc.). Connections between the RC filter and the coil concerned should be as short as possible.

☺ We would recommend the connection of probes and sensors using shielded cables. Shielding must be connected to ground on the electric switchboard side, and unconnected at the other end.

Severe electromagnetic interference may influence measurements and result in substantial measuring errors.

☺ Devices must be cleaned using a dry cloth.

☺ Any use of devices which is not compliant with the provisions of the present document may result in the poor operation or destruction of the devices concerned, and will invalidate the guarantee.

💣 No objects (screwdrivers etc.) must be inserted into the ventilation slots. The circuit may be damaged as a result, and may no longer operate correctly.

😐 Plans, drawings, descriptions and circuit diagrams must not be reproduced or disclosed to third parties without the written permission of DIGITEL, who shall retain ownership thereof. Sketches of circuit arrangements will be classified as drafts, for which we can assume no liability. General circuit diagrams prepared by ourselves will be adapted by the concession-holder concerned in accordance with local regulations. Any deterioration of our equipment associated with non-regulation use will be excluded from the terms of the guarantee, and we can accept no liability for any resulting damage to equipment which is connected to our modules. We can accept no liability for any loss or damage associated with the breakdown of devices.

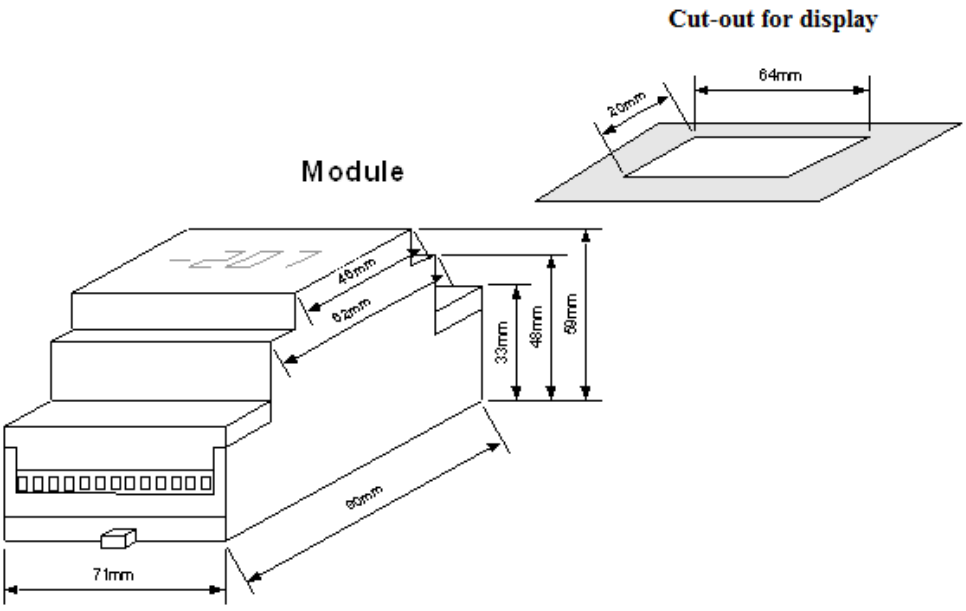
10. Technical data

		DI24D	DI24E
Power supply	Supply voltage	110-250 V a.c., 50-60 Hz	(*) 9-24 V a.c./d.c.
	Maximum input power	3W	2W
Protection rating		1	1
Contamination rating		2	2
Overvoltage category		II	II
Conditions of use	Temperature	0-40°C	0-40°C
	Humidity	0-80% (without condensation)	0-80% (without condensation)
Breaking capacity of outputs nos. 20-21, 22-23, 24-25 (zero-potential)	Resistive load	8A 250 V a.c.	8A 250 V a.c.
	Inductive load	3A 250 V a.c.	3A 250 V a.c.
Clock	Reserve operating margin	4 days	4 days
Temperature measurement (PT1000 probe)	Range of measurement	-99°C to +170°C	-99°C to +170°C
Temperature measurement (DI-SI probe)	Range of measurement	-50°C to +100°C	-50°C to +100°C
Pressure sensor for DI24DE and DI24EE	Range of measurement	0 – 10 V	0 – 10 V
Humidity probe	Range of measurement	4 – 20 mA	4 – 20 mA
Pressure sensor	Range of measurement	4 – 20 mA	4 – 20 mA

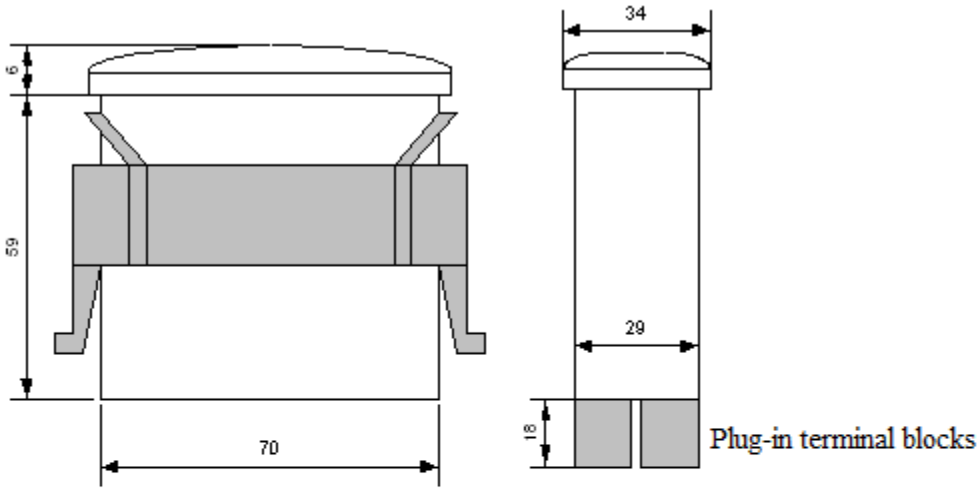
(*) 18 – 24 V a.c./d.c., where 4 – 20 mA sensors are used

11. View of housings and perforation plane

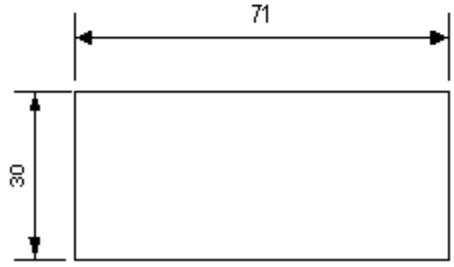
11.1 DI24D



11.2 DI24E



Perforation plane



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User Manual

DI24 – MANAGEMENT OF COOLING UNITS

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Table of Contents

1. *Introduction*

It is assumed that the reader of this document will previously have read the manual entitled "Introduction". The latter describes all the basic concepts which are essential to an understanding of the present document, and of the concept of the NEWEL2 product range in general.

This manual describes the operation of slave units for the ***regulation of cooling units. In this case, the parameter [r1] in the basic configuration will be programmed to 0.***

2. *Connections*

Connections will be completed in accordance with the circuit diagrams shown in Figure 1 and Figure 2

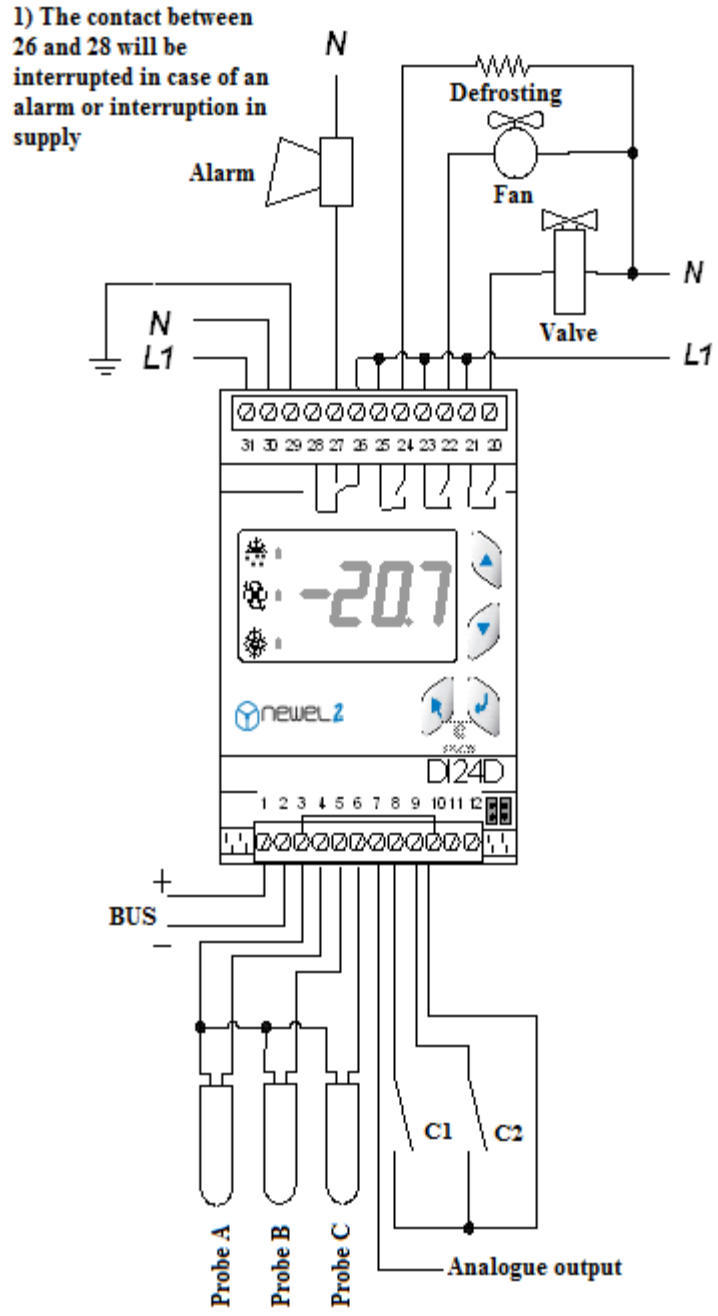


Figure 1 : DI24D

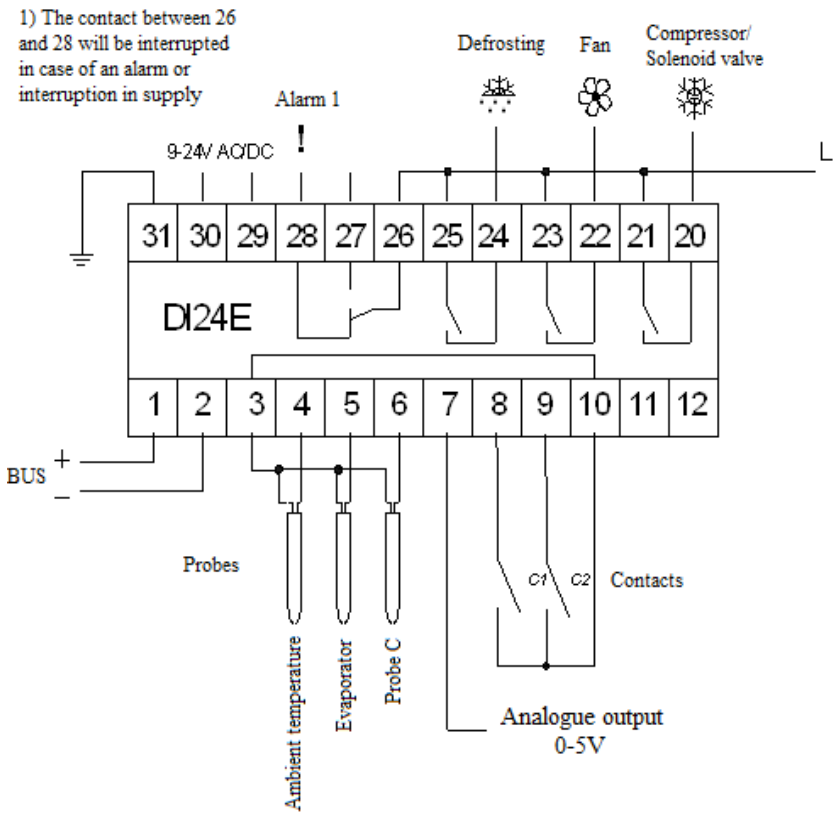


Figure 2 : DI24E

Three temperature probes, designated A, B and C, may be connected to a satellite unit. The first of these will assume the role of an ambient probe. This probe is used for the regulation of temperature between the values **[t1]** and **[t1]** + **[t2]**.

The setpoint is programmable within a range of **[t3]** - **[t4]**.

The high and low ambient temperature alarm thresholds are adjustable in parameters **[t5]** and **[t6]**, while the delay is programmable in **[t7]**. Probe B, installed in the evaporator, controls the end of defrosting and delivers the command function for the fan. In positive temperature cooling units, with no electrical defrosting, this probe is not mandatory. The parameter **[d1]** will define whether the probe B is present or not. Probe C is also optional. This probe may be used for the measurement of the core temperature of products, or for the execution of a two-probe regulation function (see Chapter 3). Alarm limits and the alarm delay will also be programmable for probes B and C in the corresponding menus.

It is possible to define a minimum start-up time and a minimum shutdown time for the compressor/valve using the parameters **[t11]** and **[t12].**

[d1] Is probe B present (*Defrosting menu*)
[t1] Setpoint (*T. ambient menu*)
[t2] Delta (*T. ambient menu*)
[t3] Lower setting limit for setpoint (*T. ambient menu*)
[t4] Upper setting limit for setpoint (*T. ambient menu*)
[t5] Lower alarm limit (*T. ambient menu*)
[t6] Upper alarm limit (*T. ambient menu*)
[t7] Alarm delay (*T. ambient menu*)
[t11] Minimum operating time (*T. ambient menu*)
[t12] Minimum resting time (*T. ambient menu*)

The functions of contacts C1 and C2 are determined by parameters **[F1]** and **[F4]**. These may function as alarm contacts (with delays programmed by parameters **[F2]** and **[F5]**), setpoint offset contacts or contacts for the complete shutdown of the unit. Contact C1 may also be parameterized as a door contact. In this case, it may interrupt the supply to the solenoid valve and the fan when the door opens. Upon the closure of the door, reclosing will be completed after the time interval programmed in parameter **[F3]**. An alarm will be actuated where the duration of the door opening exceeds the time programmed in parameter **[F2]**. The fan and the solenoid valve will also restart after this time interval, even if the door remains open.

Contact C2 may be used for the management of defrosting operations – see "defrosting pulse" *§4.7* and "management of multi-evaporator units" *§5.*

3. Regulation with 2 probes

The temperature may be regulated using 2 probes. Using the measurements from probe A and probe C, the module will calculate an estimated product temperature using the following formula:

$$t\text{Products} = \frac{probeA.(100 - C5)}{100} + \frac{probeC.C5}{100}$$

This virtual temperature is used as a regulated value. The parameter **[C5]** indicates the significance of probe C in relation to probe A (in percentage terms) in the estimation of the product temperature. Where probe C is absent (**[C1]** = 0) or the parameter **[C5]** = 0, only probe A will be used for regulation.

4. Defrosting

Various types of defrosting will be programmable using **[d2]**:

4.1 Electrical defrosting

In this case, defrosting operations will commence at the times programmed in parameters **[d8 – d13]** and will end when the defrosting temperature achieves the maximum limit **[d5]** or when the maximum duration programmed in parameter **[d6]** has been exceeded. Time intervals should be programmed with a maximum duration of sufficient length to ensure that, in all cases, the end of defrosting will be controlled by the evaporator probe. The interruption of defrosting by the overrun of a programmed time interval should only occur in case of a fault on a probe or the failure of the heating system; an alarm will be triggered as a result. During defrosting, the valve will be closed. The valve will open when the evaporator achieves the end of defrosting temperature **[d5]** and the valve delay time after defrosting (run-off) has elapsed (parameter **[d3]**). The parameter **[d7]** will allow the elimination of certain defrosting operations which will not be essential during periods of low demand for refrigeration. The satellite unit will compute the total valve opening time since the last defrosting operation in the parameter **Duration of valve opening since last defrosting** in the *Info (TelesWin)* menu. Before each defrosting operation, this time will be compared with the value entered for parameter **[d7]**. If this value is lower (indicating that the demand for refrigeration since the last defrosting operation has been low), the defrosting operation to be executed will be ignored. By programming a zero value for this parameter, this criterion will be rendered inoperative.

[C1] Probe C is present (*Probe C menu*)
[C5] Significance of probe C in the estimation of product temperature (*Probe C menu*)
[d2] Type of defrosting (*Defrosting menu*)
[d3] Valve delay time after defrosting (*Defrosting menu*)
[d5] End of defrosting temperature (*Defrosting menu*)
[d6] Maximum duration of defrosting (*Defrosting menu*)
[d7] Defrosting cancelled if valve opening time is less than (*Defrosting menu*)
[d8] Start of defrosting n° 1 (*Defrosting menu*)
[d13] Start of defrosting n° 6 (*Defrosting menu*)
[F1] Operation of contact C1 (*Setting menu*)
[F2] Alarm delay for contact C1 (*Setting menu*)
[F3] Time delay for valve and fan after door closure (*Setting menu*)
[F4] Operation of contact C2 (*Setting menu*)
[F5] Alarm delay for contact C2 (*Setting menu*)

4.2 Air defrosting, with fan ([d2=1]):
In cold stores with positive temperatures, the use of heating for the completion of defrosting operations may be superfluous. In this case, the valve will be closed during defrosting, while the fan will remain connected to supply. This type of defrosting will not require an evaporator probe.

4.3 Air defrosting, without fan ([d2=2]):
Operates in the same way as the defrosting operation described above, but with the fan disconnected from supply.

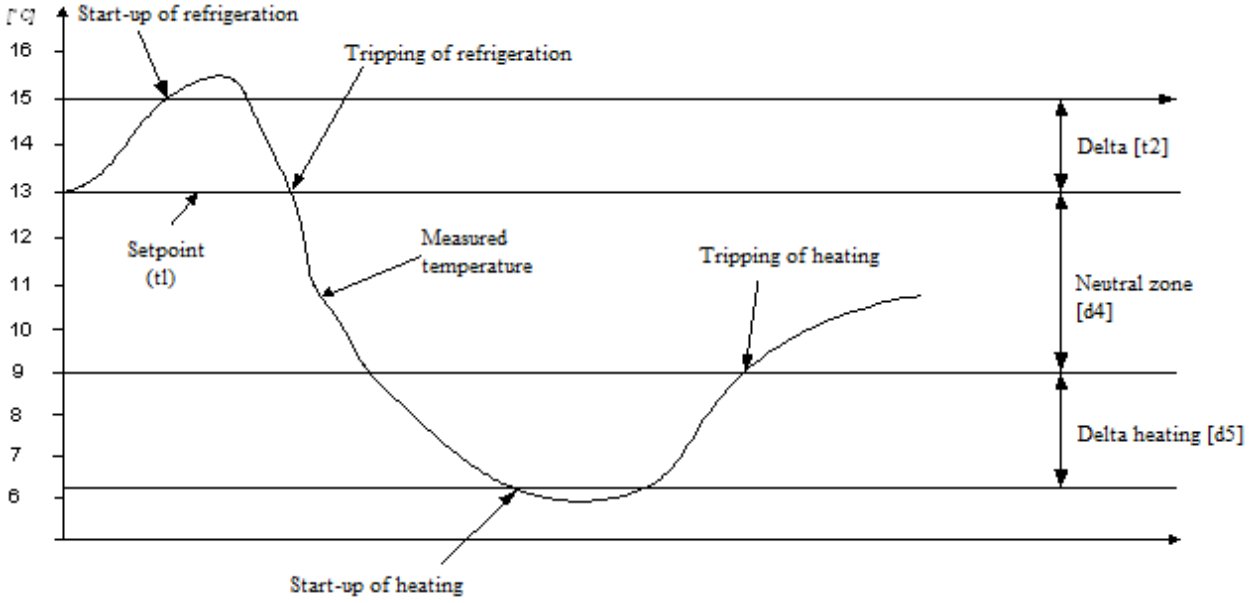
4.4 Economy defrosting ([d2=3]):
In this case, fan-assisted air defrosting will be completed during the time programmed in parameter **[d6]**. If, once this time has elapsed, the evaporator temperature is lower than parameter **[d5]**, override defrosting will be initiated. If this is not the case, the heating system will not start up. An evaporator probe will be required for this purpose.

4.5 Defrosting with clock function ([d2=4]):
Where this parameter is programmed accordingly, defrosting will proceed as per electrical defrosting, but no alarm will be triggered where the maximum defrosting time is exceeded. The defrosting probe will not be mandatory.

4.6 Control of heating system for air conditioning ([d2=5]):
In this case, the defrosting relay will be used to regulate the heating system, and will be controlled by the ambient probe.

The operation of the refrigeration system is similar to that described above. In the case of heating, where the temperature measured by the ambient probe falls below **[t1] – [d4] – [d5]**, the heating contact will close, and where the ambient temperature rises above **[t1] – [d4]**, the contact will open and heating will be interrupted.

This operation is represented graphically in the diagram below:



4.7 Defrosting pulse (operation of C2 contact = defrosting pulse ([F4=5]):
In this case, defrosting will be initiated when the contact C2 closes for over 2 seconds, provided that there is no defrosting operation already in progress. Defrosting will terminate when the end of defrosting temperature is achieved or the maximum defrosting time has elapsed, regardless of the status of contact C2.

The ambient temperature alarm will be inhibited during defrosting, and its time delay will be reset to zero upon the completion of defrosting.

4.8 Gas defrosting ([d2=7]):

[d2] Type of defrosting (*Defrosting menu*)
[d4] Neutral zone for heating/refrigeration (*T. ambient menu*)
[d5] Delta heating (*T. ambient menu*)
[d6] Maximum defrosting time (*Defrosting menu*)
[F4] Function of contact C2 (*Setting menu*)
[t1] Setpoint (*T. ambient menu*)

5. Management of multi-evaporator units

Where installations are equipped with a number of evaporators with electrical defrosting, two options are possible:

1. Each evaporator is controlled by a separate solenoid valve. Defrosting operations on all evaporators may proceed simultaneously or separately.
2. All evaporators are supplied by the same solenoid valve, and will defrost at the same time.

In the first case, each evaporator will be considered as an independent cooling unit, and will be managed by a separate satellite unit. Connections will be completed in accordance with Figure 1 (DI24D), Figure 2 (DI24E).
In the second case, connections will be completed in accordance with Figure 3 (DI24D, Figure 4 (DI24E).
The 2 satellite units will be programmed as follows:

Master (management of first evaporator, valve and fan):

- **operating mode**: "cooling unit" **[r1=0]**
- "electrical" **defrosting [d2=0]**
- **defrosting times, maximum duration, end of defrosting temperature**, etc.
- **operation of contact C2** "monitoring of defrosting on additional evaporator" **[F4=6]**

Slave(s) (management of subsequent evaporators):

- **operating mode:** "management of evaporators 2 – 4" **[r1=4]**
- **maximum duration, end of defrosting temperature** in the *Defrosting* menu will be programmed as per the main unit.

Each evaporator will be provided with a defrosting output and a separate end of defrosting probe. The defrosting of the first evaporator will simultaneously initiate the defrosting of the other evaporators by the generation of a defrosting "pulse" on the C2 input of the slave satellite unit. Defrosting operations will be interrupted separately on each evaporator, upon the achievement of the value programmed in parameter **[d5]**. The solenoid valve will open after the time delay programmed in parameter **[d3]**. This time delay will commence upon the completion of defrosting operations on all the evaporators (input C2 on the master satellite unit will open).

Each probe is provided with a temperature alarm function.

[d2] Type of defrosting (*Defrosting menu*)
[d3] Valve delay after defrosting (*T. ambient menu*)
[d5] End of defrosting temperature (*T. ambient menu*)
[F4] Function of contact C2 (*Setting menu*)
[r1] Operating mode (*Basic configuration menu*)

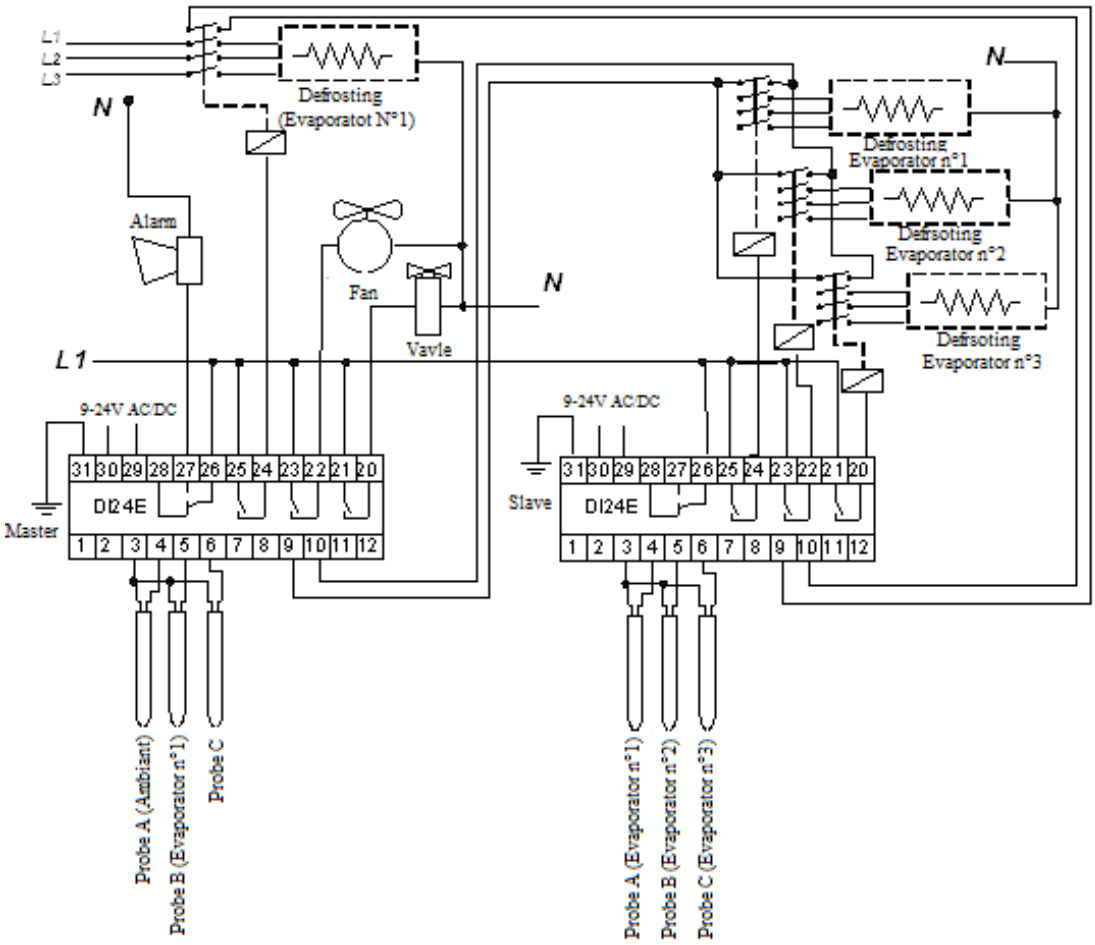
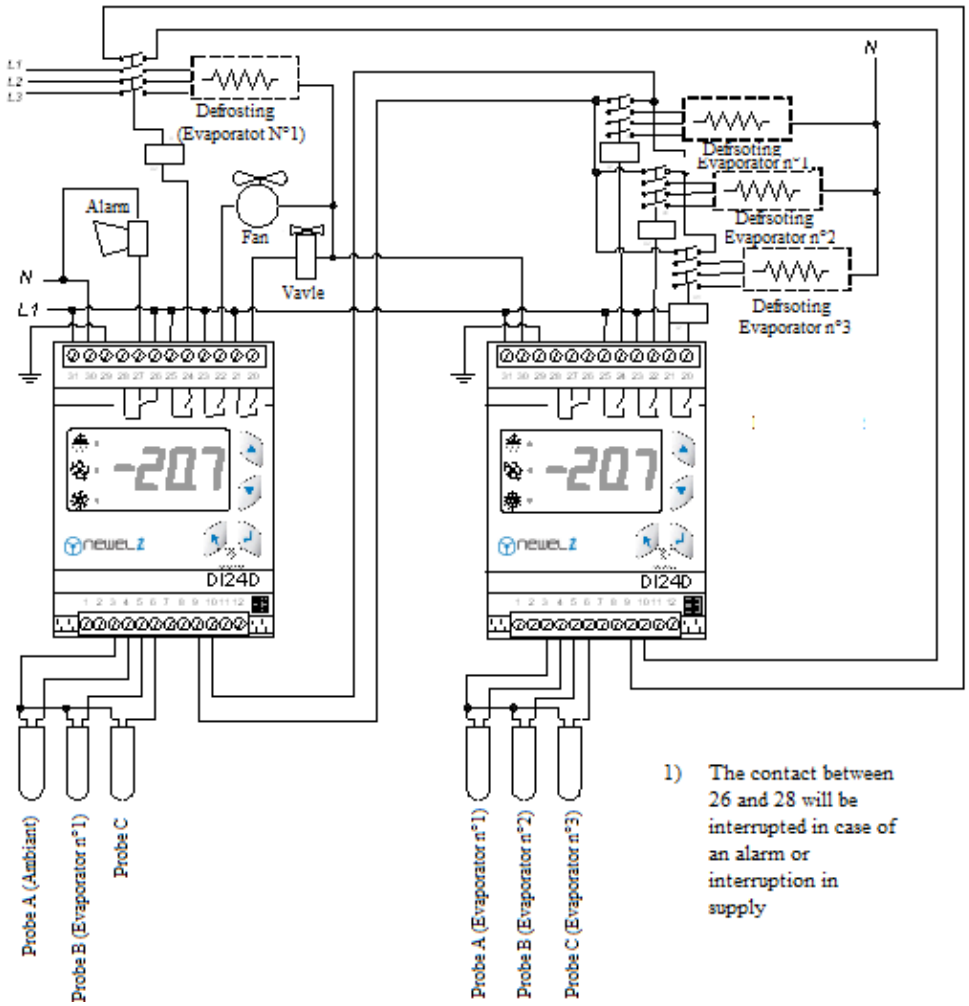


Figure 3

DI24E



1) The contact between 26 and 28 will be interrupted in case of an alarm or interruption in supply

Figure 4
DI24D

6. Management of fan

The operation of the fan (programmable using **[U1]**) may be parameterized as follows:

- **[U1=0]** If the evaporator probe is present, the supply to the fan will be interrupted during and after defrosting, until the temperature falls below parameter **[d4]**
- **[U1=0]** If the evaporator probe is absent, the supply to the fan will be interrupted during and after defrosting, up to the time programmed in parameter **[d4]**
- **[U1=1]** The fan is still in service
- **[U1=2]** The fan will be controlled simultaneously with the solenoid valve
- **[U1=3]** The fan is controlled by the evaporator probe. It will start up when the evaporator temperature falls below the value defined for parameter **[U2]**, and will trip when the temperature exceeds the value **[U3]**.
  The supply to the fan and the valve will be interrupted when the door opens, and after the closure thereof until the time delay programmed in parameter **[F3]** has elapsed. If this parameter is set to zero, this function will be cancelled.

7. Analogue output

This output is intended for the control of a FXA01 module, which is provided with a 4-20 mA and 0-10 V output – see Figures 5 and 6. This output is used for the regulation of the fan speed, the control of a three-way valve, electronic pressure reducer, etc.

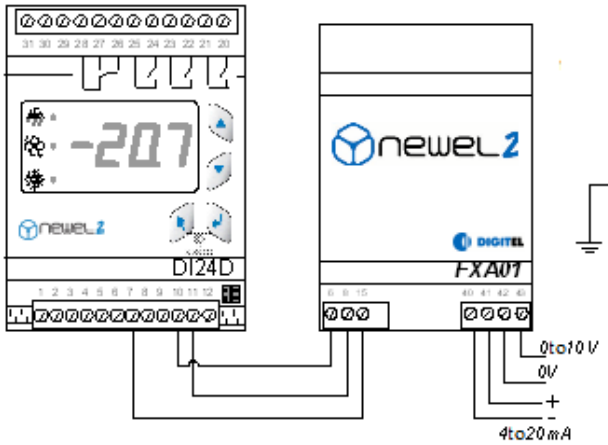


Figure 5: DI24D

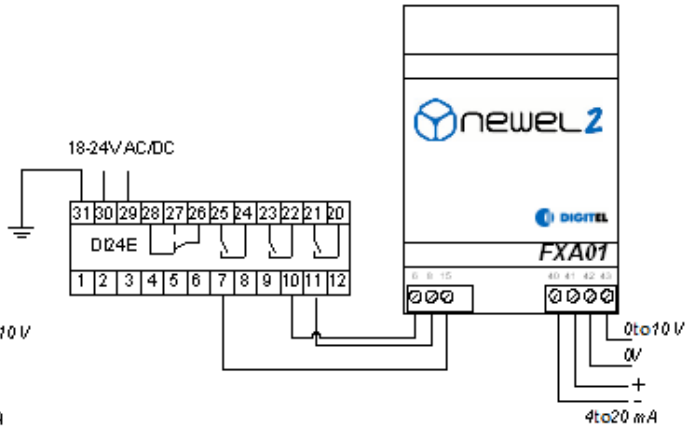
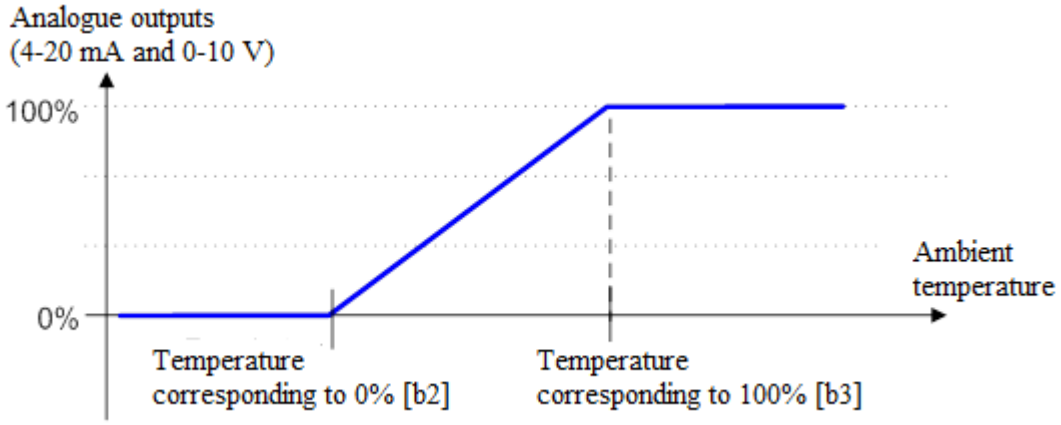


Figure 6: DI24E

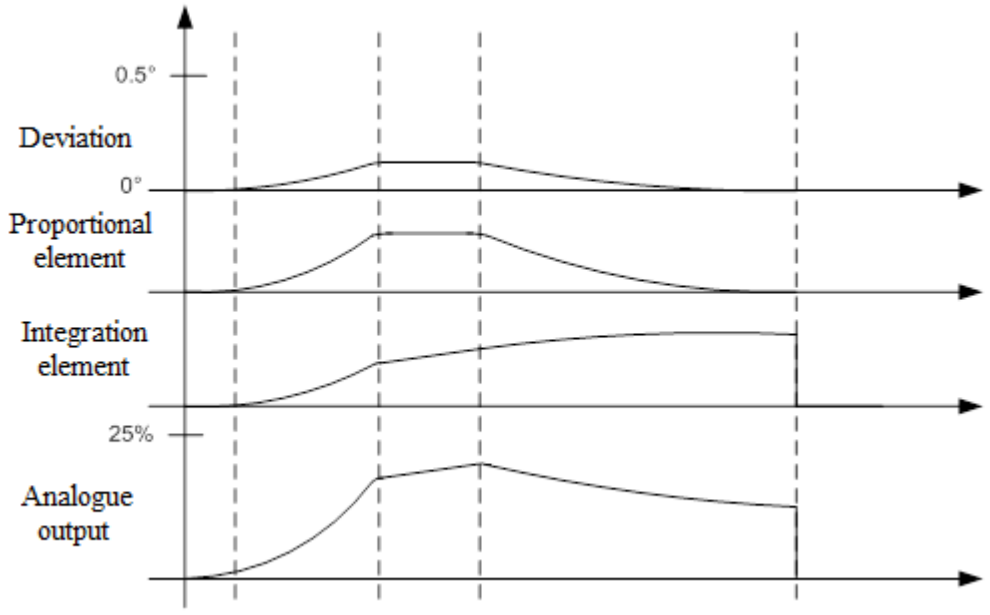
The function of this output is programmable in parameter **[b1]**, which may assume the following values:

- 0 – The output varies proportionally to the value of the temperature, between parameters **[b2]** and **[b3].** Values for **[b2]** and **[b3]** are offset in parallel to the setpoint offsets.

[b1] Operation of analogue output (*Analogue Output menu*)
[b2] Analogue output – temperature corresponding to 0% (°C) (*Analogue Output menu*)
[b3] Analogue output – temperature corresponding to 100% (°C) (*Analogue Output menu*)
[d4] If Probe C is present: start-up temperature of fan after defrosting (*Defrosting menu*)
If Probe C is absent: delay to fan start-up after defrosting (*Defrosting menu*)
[F3] Delay to start-up of compressor/solenoid valve after door closure (*Contact c1, c2 menu*)
[U1] Operation of fan (*Fan menu*)
[U2] Start-up temperature of fan (°C) (*Fan menu*)
[U3] Trip temperature of fan (°C) (*Fan menu*)



- 1 – PI type control. This type of control will permit, for example, the regulation of the rate of flow of the coolant (or heat conduction) fluid by means of a progressive valve, which is controlled by a 4-20 mA or 0-10 V input. Frequently used in large-scale fruit and vegetable stores, this form of control allows a high degree of accuracy in temperature regulation and the maintenance of a high level of humidity. Calculation of the analogue output is based upon the deviation between the ambient temperature and the setpoint value **[t1]**, and is comprised of two elements. The proportional element corresponds to the deviation multiplied by the proportional coefficient **[b2]**. The integration element increases progressively by a value which is proportional to the deviation, multiplied by the integration coefficient **[b3]** (%). See diagram below.



- 2 – Electronic pressure reducer (modules DI24DE and DI24EE). In this mode, the analogue output regulates overheat by means of an electronic pressure reducer, which is controlled by a 4-20 mA or 0-10 V output. See next chapter.

[b2] Proportional coefficient for PI regulation (%) (*Analogue Output Menu*)
[b3] Integration coefficient for PI regulation (%) (*Analogue Output Menu*)
[t1] Setpoint (°C) (*Ambient temperature menu*)

8. Electronic pressure reducer

Figure 7: DI24DE

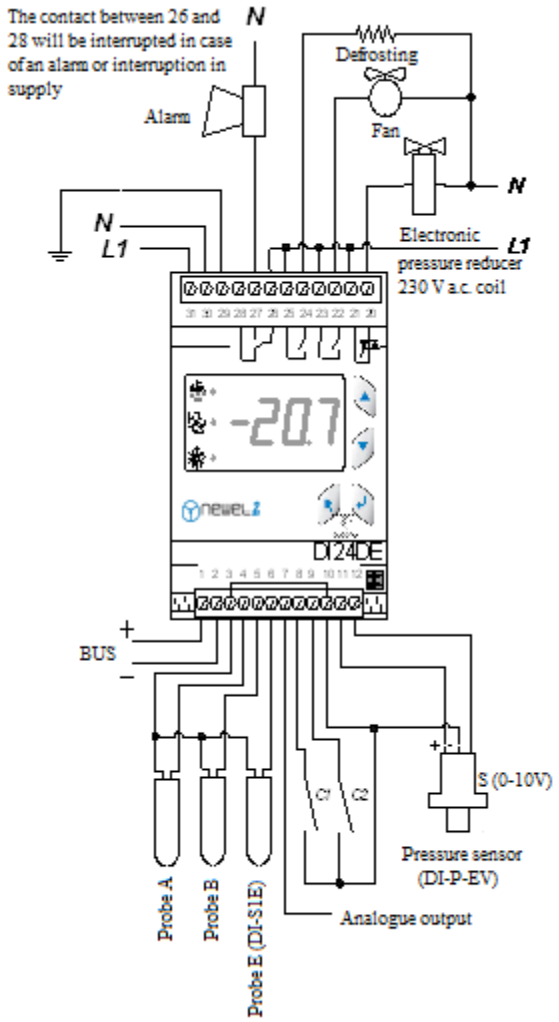
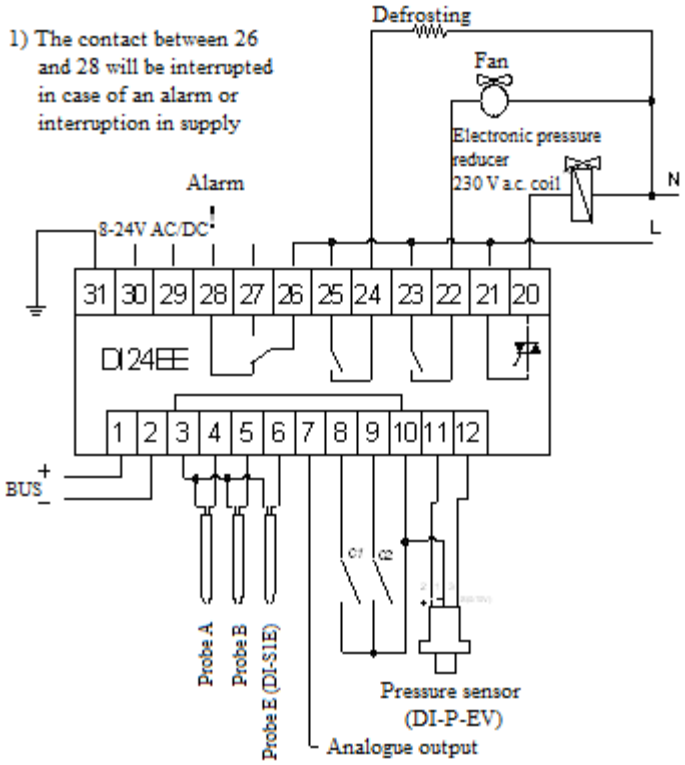
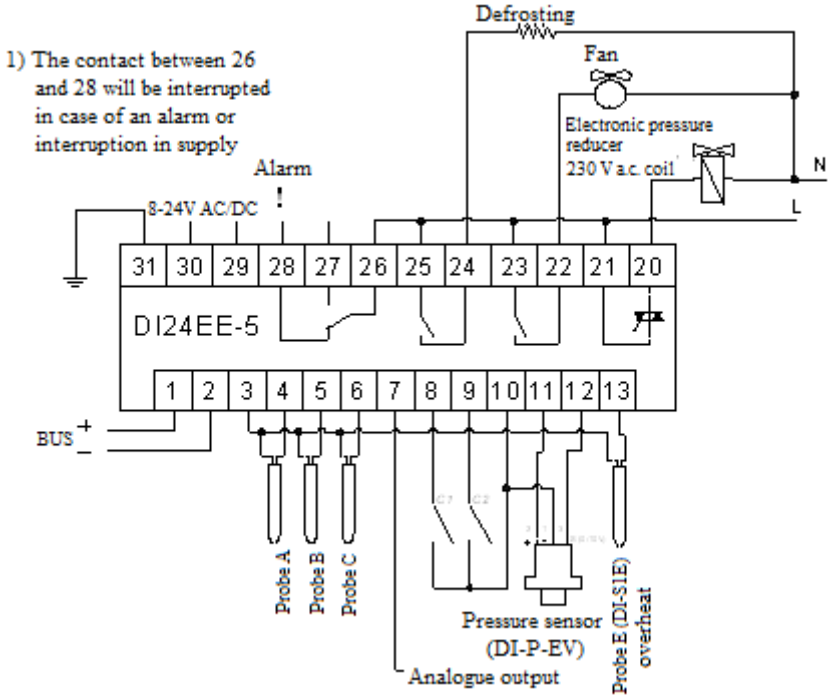


Figure 8-1: DI24EE



Obsolete type. Replaced by DI24EE-5

Figure 8-2: DI24EE-5



Modules DI24DE, DI24EE and DI24EE-5, in addition to all the other functions described in the previous paragraphs, will be responsible for the regulation of overheat by means of electronic pressure reducers. These modules can be used for the management of pulse-operated pressure reducers (regulation of pulse width) or pressure reducers with progressive opening (e.g. using a pulse motor), controlled by a 4-20 mA or 0-10 V analogue signal. Overheat will be measured using a pressure sensor and a temperature probe (probe E) fitted to the evaporator output.

Parameter **[S1]** specifies the mode of operation of the pressure reducer.

- 0 – self-adapting regulation. The module will attempt, insofar as possible, to maintain overheat within the limits programmed in parameters **[S2]** and **[S3]**. The regulation function is based upon a PID algorithm. Regulation is refined by the continuous analysis of the behaviour of the installation. After a number of hours of operation, information collected by this method can be used for the automatic optimization of internal regulation parameters. This optimization will proceed continuously, and will adapt these parameters to changes in operating conditions. The pressure reducer will open when the temperature exceeds the neutral zone defined by parameters **[t1]** + **[t2**].

- 1 – continuous self-adaptation. The pressure reducer operates continuously. The regulator attempts to maintain the temperature in the centre of the neutral zone. The corresponding duration of opening is calculated by the observation of the behaviour of the unit concerned. In this mode, overheat will only be regulated as it approaches the lower limit [S2] programmed for the prevention of the return of fluid to the liquid state.

The type of coolant fluid will be programmed in parameter **[S4]**. The pressure reducer will remain completely closed where the intake pressure exceeds the MOP limit programmed in **[S6]**.

In case of the regulation of a number of evaporators in close proximity, where the load loss between their outputs is negligible, the same pressure sensor may be used for the measurement of the intake pressure of a number of DI24 modules (up to a maximum of 8). Each evaporator will be equipped with a separate temperature probe. The arrangement of connections is described below.

[S1] Overheat regulation (*Overheat Menu*)
[S2] Minimum overheat setpoint (*Overheat Menu*)
[S3] Maximum overheat setpoint (*Overheat Menu*)
[t1] Setpoint (*T. ambient menu*)
[t2] Delta (*T. ambient menu*)
[S4] Coolant fluid (*Overheat Menu*)
[S6] MOP limit (maximum operating pressure) (*Overheat Menu*)

For larger capacity ratings, the use of progressive pressure reducers is recommended. These may be controlled by analogue outputs, in accordance with the circuit layout described below.

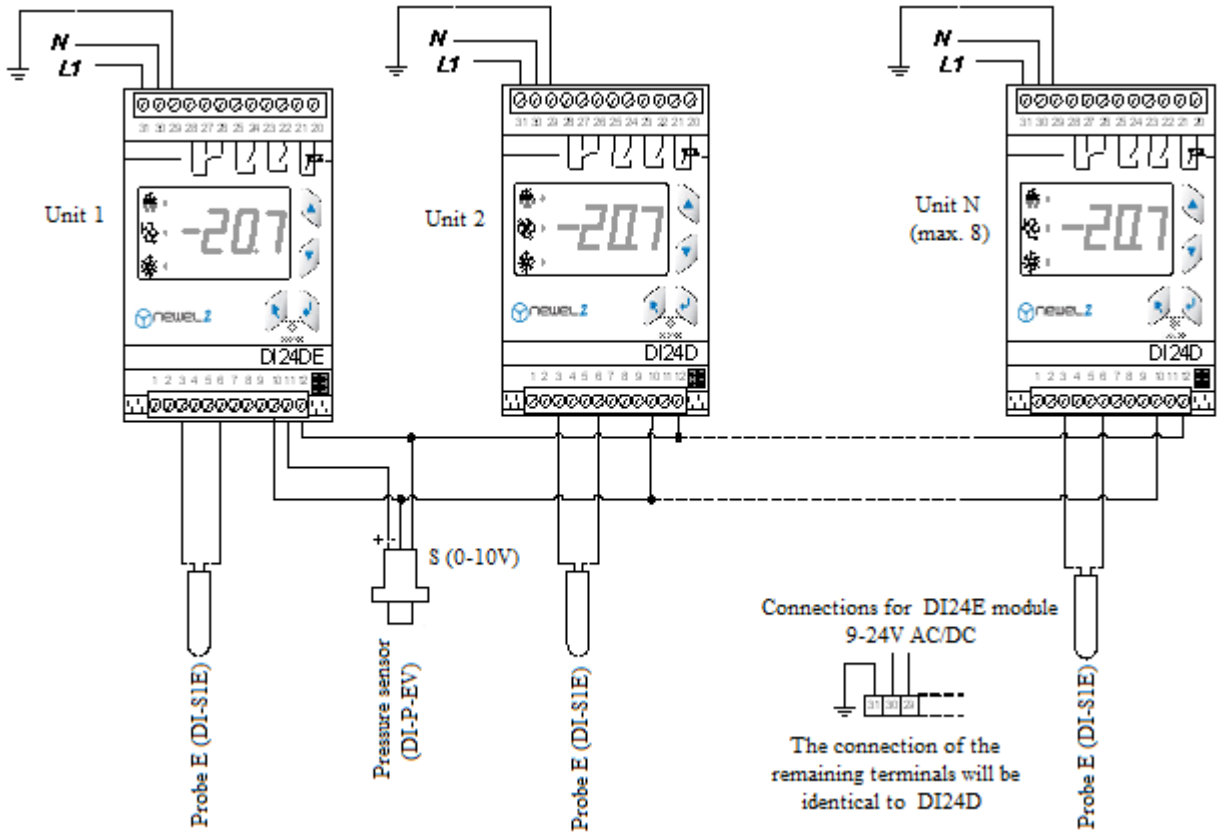
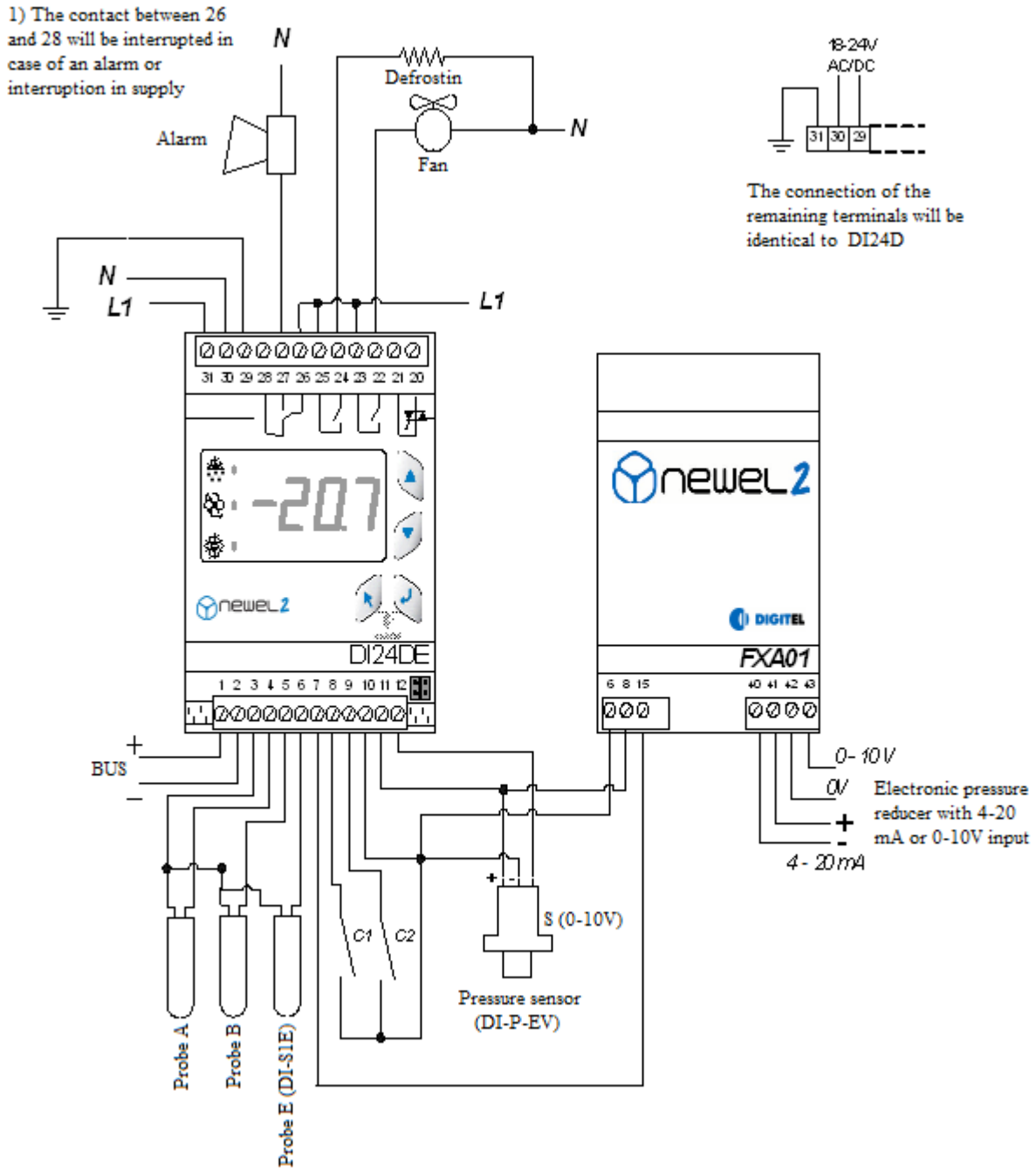


Figure 10: DI24DE



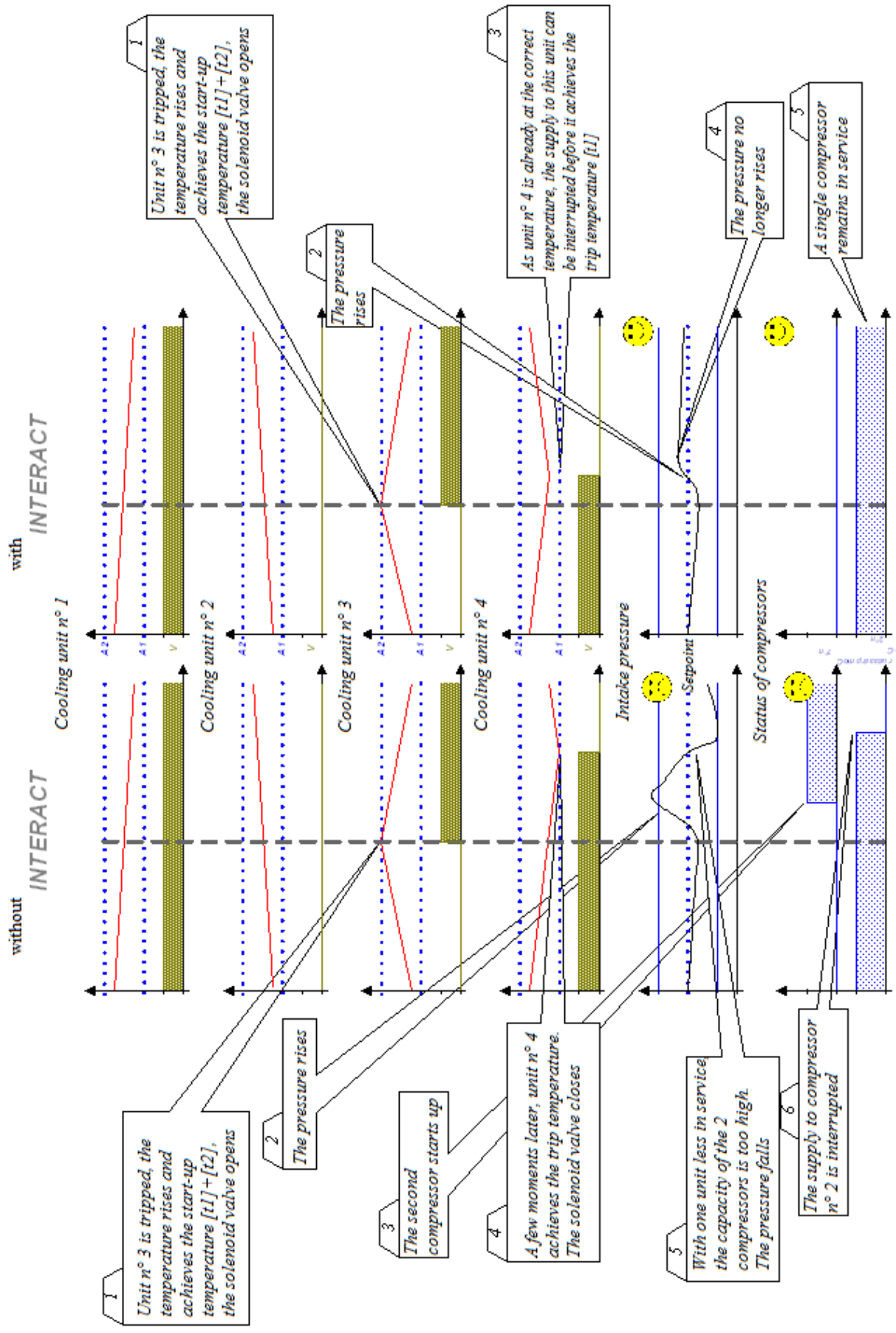
Pressure reducers of various different types may be used with DI24DE and DI24EE modules. Contact your dealer for further details.

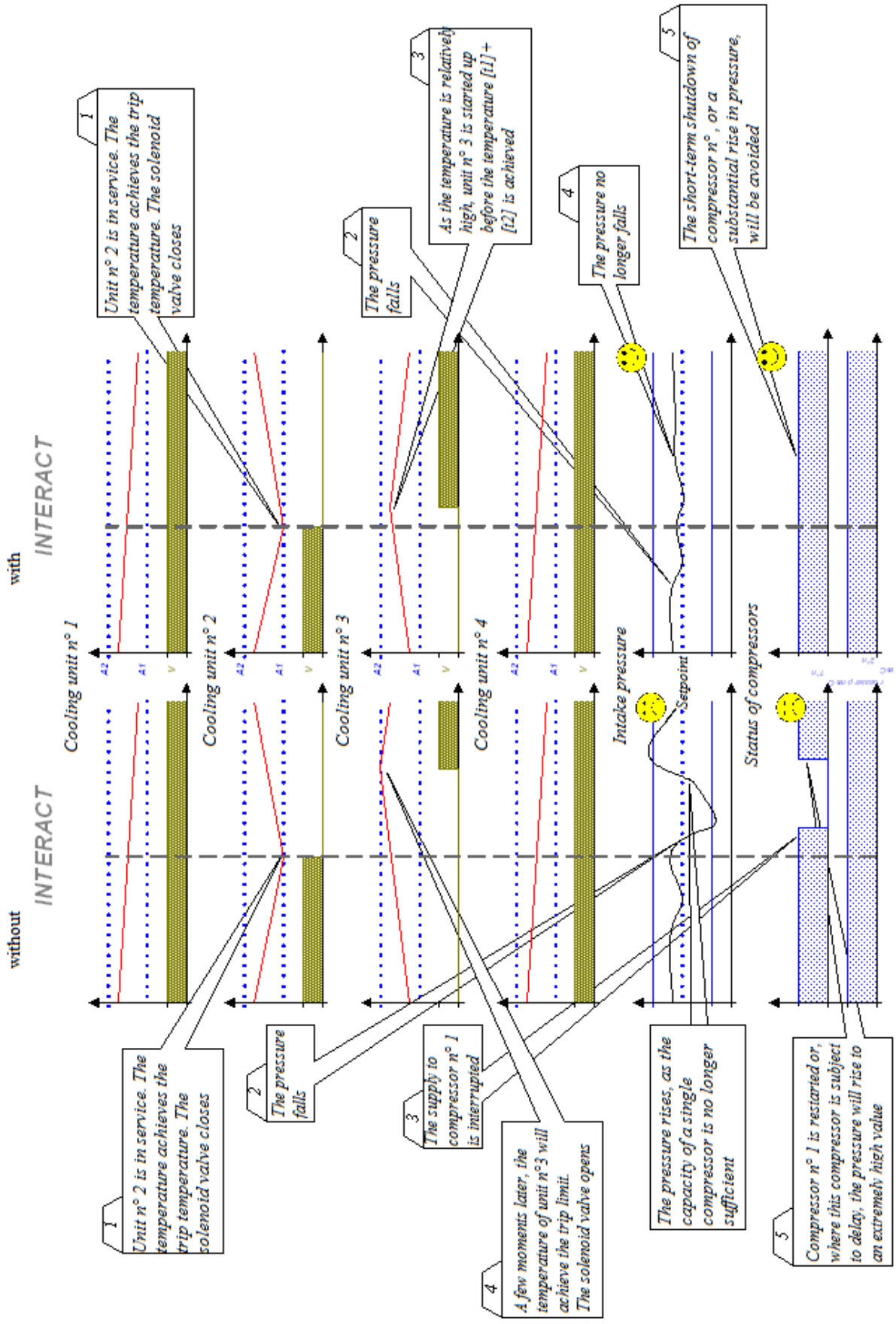
9. "INTERACT" type management

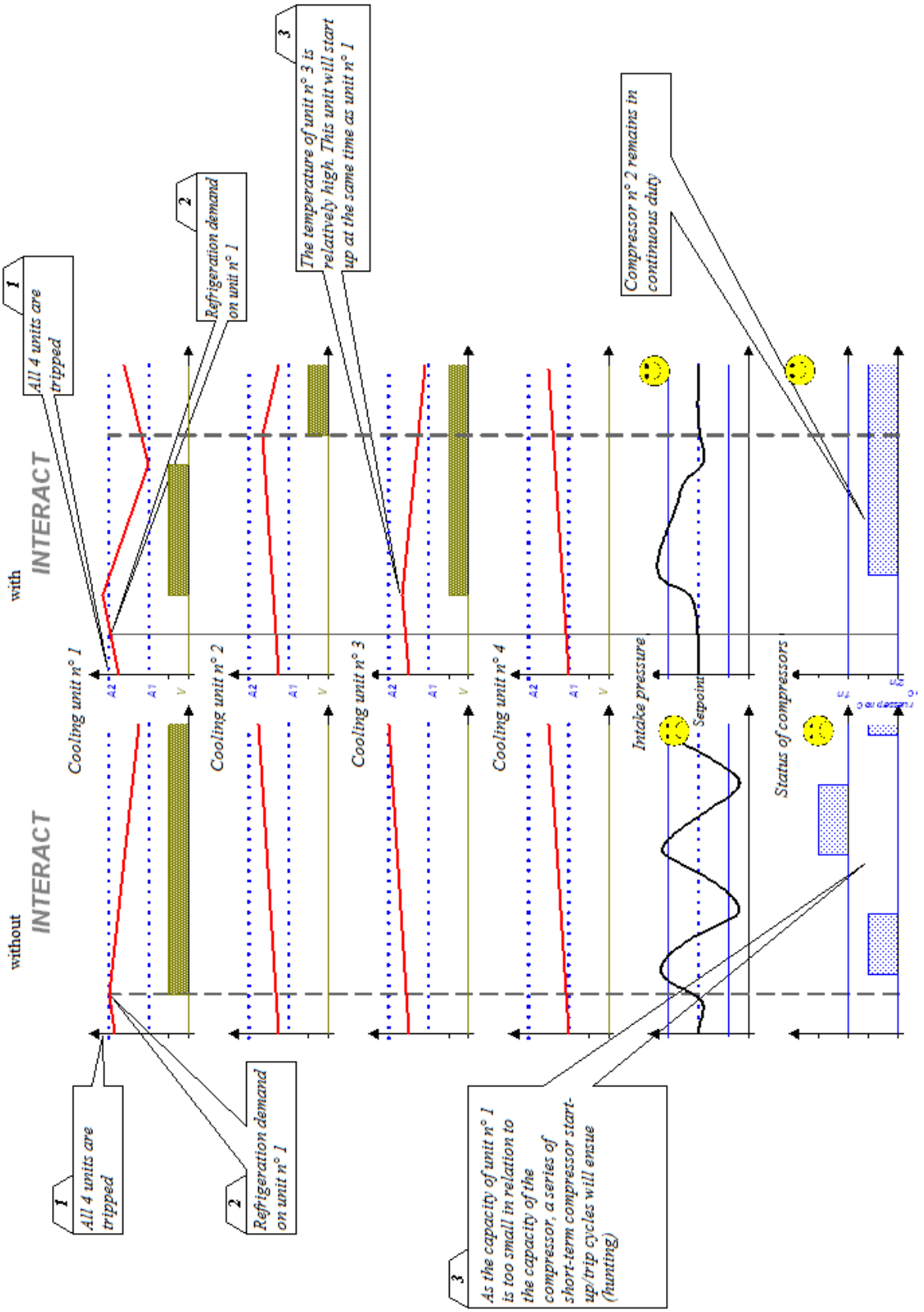
A conventional refrigeration circuit is managed by a central regulation function and a number of regulation functions for cooling units. These regulation functions are completely independent, and take no mutual account of each other. Refrigeration demand in the various units will be random and unforeseeable. The central regulation function will not be aware of the number of units in service and the actual load demand.
The most rudimentary systems will only respond where the pressure exceeds consecutive and preset thresholds.
More advanced regulation functions (e.g. of the PID type incorporated in NEWEL2) will observe trends for pressure variation, and will attempt to act in anticipation by adding or tripping compressors before the pressure deviates too far from the setpoint value. Although these regulation functions are more effective, in the absence of accurate information on events proceeding on the cooling unit side, they cannot deliver optimum management.
On the basis of this observation, Digitel has developed a regulation function which considers the entire installation, based upon ***interaction between the modules responsible for the management of cooling units and the module which controls the central unit***. This system is described as **INTERACT**. The program which manages this function is complex. A detailed description of its operation would substantially exceed the scope of this manual. A selection of the functions which will ensure the optimum management of the installation is set out below.

- The software considers the cooling unit and the central unit as two elements of a closely-linked combination. Conventional regulation systems regulate pressure by the start-up and tripping of compressors. The **INTERACT** system optimizes this regulation function by also acting on the cooling units.
- Where the intake pressure drops and falls below the setpoint value, rather than interrupting the supply to one of the compressors, the software will identify a cooling unit, the temperature of which is relatively close to the start-up limit. The software will start-up the unit concerned before this limit is achieved, in order to restore the pressure.
- Where the pressure rises, the software will attempt to identify a unit, the temperature of which is already acceptable, and will trip this unit if required, rather than starting up an additional compressor.
- The regulation system will undertake the continuous calculation of the capacity demand of all the cooling units, and will compare this value to the capacity delivered by the central unit. In the same way as the movement in pressure, the result of this comparison will contribute to the decision on the response to be adopted.
- Where a given unit of low capacity, in relation to the capacity of a compressor, generates demand for refrigeration at a time when the supply to all the remaining units is interrupted, the software will automatically associate this unit with another unit, which may already be in service. If the software cannot identify any such unit, it will delay the start-up of the unit of low capacity.

The three diagrams below show a schematic representation of the INTERACT principle, in comparison with conventional regulation functions. The installation concerned comprises 4 cooling units, supplied by a two-compressor central unit.


with INTERACT
without INTERACT
Cooling unit n° 1
Cooling unit n° 2
Cooling unit n° 3
Cooling unit n° 4
Intake pressure
Setpoint
Status of compressors
1 Unit n° 3 is tripped, the temperature rises and achieves the start-up temperature [t1]+[t2], the solenoid valve opens
2 The pressure rises
3 The second compressor starts up
4 A few moments later, unit n° 4 achieves the trip temperature. The solenoid valve closes
5 With one unit less in service the capacity of the 2 compressors is too high. The pressure falls
6 The supply to compressor n° 2 is interrupted
1 Unit n° 3 is tripped, the temperature rises and achieves the start-up temperature [t1]+[t2], the solenoid valve opens
2 The pressure rises
3 As unit n° 4 is already at the correct temperature, the supply to this unit can be interrupted before it achieves the trip temperature [t1]
4 The pressure no longer rises
5 A single compressor remains in service


with
INTERACT
without
INTERACT
Cooling unit n° 1
Cooling unit n° 2
Cooling unit n° 3
Cooling unit n° 4
Intake pressure
Setpoint
Status of compressors
1 Unit n° 2 is in service. The temperature achieves the trip temperature. The solenoid valve closes
2 The pressure falls
3 As the temperature is relatively high, unit n° 3 is started up before the temperature [t1]+ [t2] is achieved
4 The pressure no longer falls
5 The short-term shutdown of compressor n° , or a substantial rise in pressure, will be avoided
1 Unit n° 2 is in service. The temperature achieves the trip temperature. The solenoid valve closes
2 The pressure falls
3 The supply to compressor n° 1 is interrupted
4 A few moments later, the temperature of unit n°3 will achieve the trip limit. The solenoid valve opens
The pressure rises, as the capacity of a single compressor is no longer sufficient
5 Compressor n° 1 is restarted or, where this compressor is subject to delay, the pressure will rise to an extremely high value


with INTERACT
without INTERACT
1 All 4 units are tripped
2 Refrigeration demand on unit n° 1
3 The temperature of unit n° 3 is relatively high. This unit will start up at the same time as unit n° 1
Compressor n° 2 remains in continuous duty
Cooling unit n° 1
Cooling unit n° 2
Cooling unit n° 3
Cooling unit n° 4
Intake pressure
Setpoint
Status of compressors
1 All 4 units are tripped
2 Refrigeration demand on unit n° 1
3 As the capacity of unit n° 1 is too small in relation to the capacity of the compressor, a series of short-term compressor start-up/trip cycles will ensue (hunting)

The **INTERACT** system represents a genuine advance in regulation technology for refrigeration installations.

The accuracy and stability of intake pressure regulation is significantly superior.

- Energy savings of the order of 10 – 15% may be achieved. This is due to a significant improvement in the regulation of intake pressure, which has the following consequences:
    - The efficiency of the central unit is improved. In practice, by the start-up of an additional cooling unit, the operation of compressors at an excessively low pressure, which will compromise their efficiency, can be avoided,
    - By eliminating periods of low pressure, excessively low evaporation temperatures, resulting in the excessive frosting of evaporators, can be avoided. The energy required for defrosting will be reduced accordingly.
- By avoiding excessively low evaporation temperatures, the dehumidification of units will be reduced, thereby improving the quality of refrigerated products.
- The service time and rest time of compressors will be extended in a spectacular fashion. Their service life will be increased accordingly. Network disturbances caused by frequent switching operations will be reduced.
- In many cases, the optimization of regulation will allow the number of compressors to be reduced, by the use of compressors of higher capacity. This is associated with a radical reduction in the cost of the central unit.

Parameter **[L3]** indicates the capacity of the evaporator in kVA for cooling units, or the total capacity of compressors for the module which manages the central unit.
The installation must be equipped with a DI48 central remote monitoring unit.

10. Standby programme

Over a number of days, the satellite unit will calculate the average opening time of the valve and the average rest time between two successive openings. Where a fault on the ambient probe is detected, the device will take no further account of information delivered by this probe, and will control the valve using the clock function. The valve will be opened for a time interval which is equal to the average opening time calculated previously, and will close for a time interval equal to the average rest time, etc. This will allow the temperature to be maintained at a level which is close to the setpoint value, provided that there has been no significant change in operating conditions on the installation. The alarm contact will be active throughout the duration of the standby programme.

Where communication with the DI48 central unit is interrupted (due to an interruption in supply, loss of the bus connection or loss of the DI48 central unit), the satellite units will continue to operate and deliver their associated functions.

11. Calibration of probes

It is possible to set a correction for each temperature probe used, in parameters [r5], [r6] and [r7]. A negative value will reduce the value displayed, while a positive value will increase the value displayed.

[L3] Capacity of evaporator (*Interact Menu*)
[r5] Correction of ambient temperature probe (*Settings Menu*)
[r6] Correction of defrosting probe (*Settings Menu*)
[r7] Correction of probe C (*Settings Menu*)

12. Setpoint offset

The setpoint temperature determined by values for parameters **[t1]** and **[t2]** may be temporarily offset by a positive or negative value, which is programmable in parameter **[t8]**. This offset will be controlled by the clock function of the module, within the time interval programmed using parameters **[t9]** and **[t10]**.

The same setpoint offset may be controlled by the closure of contacts C1 or C2, where the function of these contacts is programmed for **setpoint offset [F1=4 or F4=4]**.

The upper ambient temperature alarm limit programmed in **[t6]** will be offset at the same time and by the same value as the setpoint. The lower ambient temperature alarm limit programmed in **[t5]** will not be modified, and will remain identical.

13. Weekly schedule

This option will only be available with central unit DI48

This option provides scope for the modification of the satellite unit during periods of reduced activity, in accordance with a weekly schedule which is entered in the DI48 central monitoring unit (for example, hours of closure of supermarkets). Depending upon the programming of parameters in the "Schedule" menu during periods of closure, the satellite unit may shut down the unit concerned or offset the temperature setpoint. The latter operation will be combined with any daily offset scheduled between **[t9]** and **[t10]**.

The standard output for the control of an alarm device may be used for the control of lighting. To this end, the **Alarm output function** in the *Schedule (TelesWin)* menu will be programmed to **"*lighting control*"**. With an auxiliary relay connected to this output, it will be possible to control the lighting and closure of the night blind of a refrigeration unit – see Figure 11 (DI24E), Figure 12 (DI24D). The **Weekly schedule function?** in the *Schedule (TelesWin)* menu of the DI48 central unit must be programmed to "***yes*".**

[F1] Function of contact C1 (*C1, C2 Contact Menu*)
[F4] Function of contact C2 (*C1, C2 Contact Menu*)
[t1] Setpoint (*T. ambient menu*)
[t2] Delta (*T. ambient menu*)
[t5] Lower alarm limit (*T. ambient menu*)
[t6] Upper alarm limit (*T. ambient menu*)
[t8] Setpoint offset (*T. ambient menu*)
[t9] Start of setpoint offset (*T. ambient menu*)
[t10] End of setpoint offset (*T. ambient menu*)

Figure 11 **DI24E**

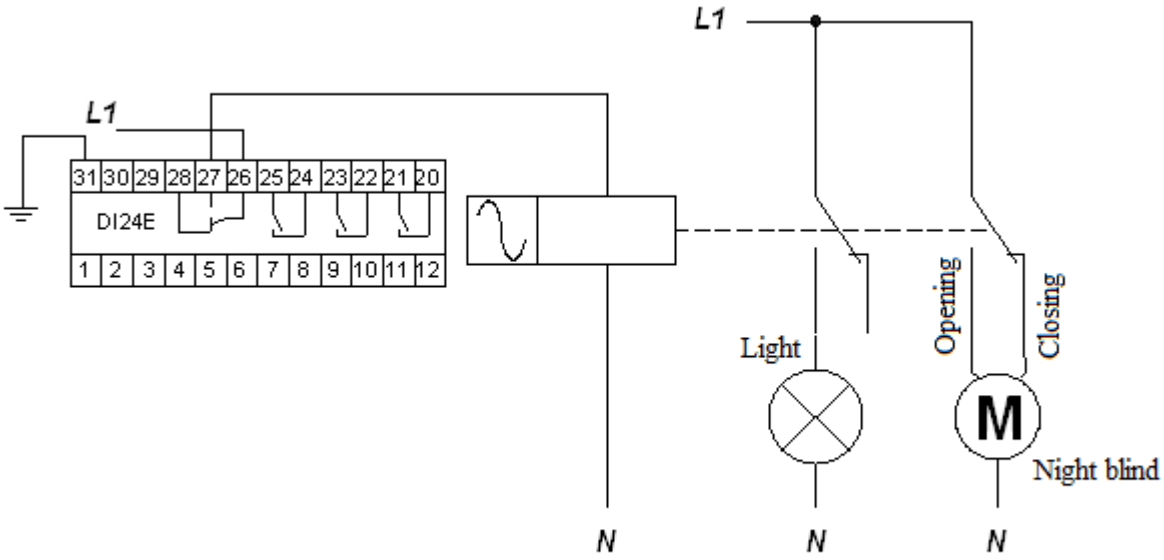
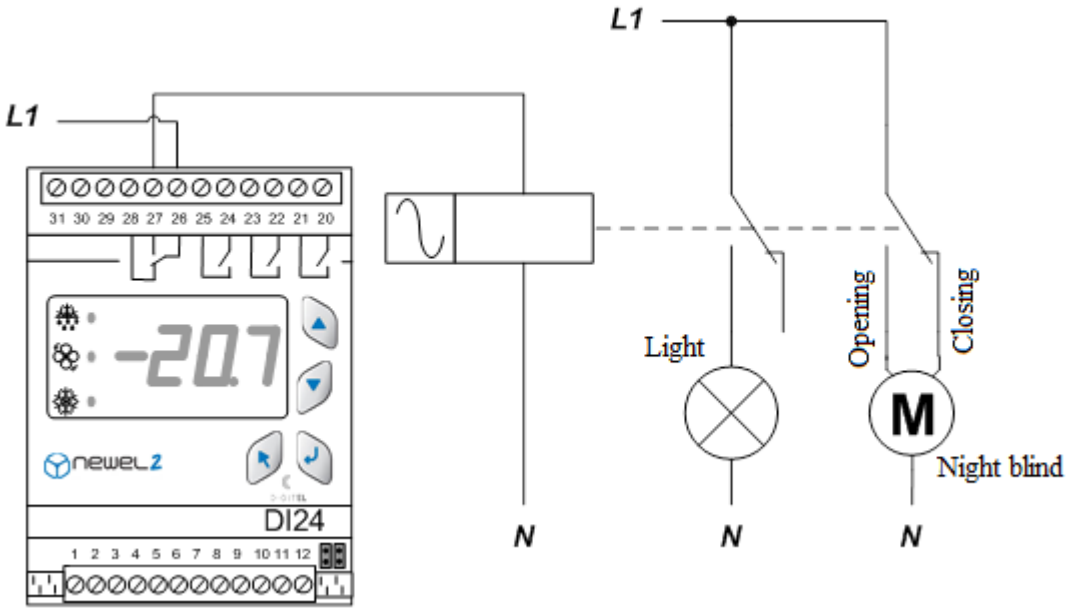


Figure 12 **DI24D**



Mode of operation of cooling unit

Basic configuration 

Symbol	*Level*	*Function*	*Comment*	*Default value*	*Value applied*
NONE	0	Password		0	
r1	3	Mode of operation *0 = cooling unit 1 = Management of compressors 2 = Universal regulation 3 = Monitoring 4 = Management of evaporators 2, 3, etc.*		0	
r20	3	Type of regulation *0 = negative unit 1 = positive unit*	r1 = 0	0	

Parameters 

	Symbol	*Level*	*Function*	*Comment*	*Default value*	*Value applied*
	NONE	0	Password		0	
Ambient temperature	t1	1	Setpoint (°C)		1	
	t2	2	Delta (°C). The device regulates between the temperatures t1 and t1+t2		1.0	
	t3	3	Lower setpoint setting limit (°C)		-90	
	t4	3	Upper setpoint setting limit (°C)		90.0	
	t13	2	Alarm limit for Probe A *0 = absolute value 1 = relative to setpoint*		0	
	t5	2	Lower alarm limit (°C)		0	
	t6	2	Upper alarm limit (°C)		10	
	t7	2	Alarm delay (min)		30.0	
	t8	2	Setpoint offset (°C)		0.0	
	t9	2	Start of setpoint offset (HH:M)		0.0	
	t10	2	End of setpoint offset (HH:M)		0.0	
	t11	3	Minimum operating time (min)		0.0	
	t12	3	Minimum rest time (min)		0.0	
Overheat (D124DE and D124EE-5)	S1	3	Overheat regulation *0 = self-adaptation 1 = continuous self-adaptation*		0	
	S2	3	Minimum overheat setpoint (°C)		5.0	
	S3	3	Maximum overheat setpoint (°C)		8.0	
	S4	3	Coolant fluid *1 = R12 2 = R22 3 = R134A 4 = R502 5 = R500 6 = MP39 7 = HP80 8 = R404A 9 = R717 (NH3) 10 = chilled water 11 = R407 (fluid) 12 = R407 (gas/fluid) 13 = R23 14 = R413A (ISCEON 49) 15 = R417A (ISCEON 59) 16 = R422A (ISCEON 79) 17 = R507 (version 8151 onwards) 18 = R744(CO2) (version 9181 onwards)*		8	
	S5	3	Correction of measurement (slide (positive) + loss of load (negative)) (°C)		0.0	
	S6	3	MOP limit (maximum operating pressure) (°C)		40.0	
	S7	3	Minimum opening of pressure reducer (%)		0	
	S8	3	Maximum opening of pressure reducer (%)		100	
	S9	3	Range of measurement of pressure sensor – lower limit (bar)		-1	
	S10	3	Range of measurement of pressure sensor – upper limit (bar)		7	
Defrosting	d1	3	Is Probe B present?		0	
	d2	2	Type of defrosting *0 = electrical 1 = air-assisted, with fan 2 = air-assisted, without fan 3 = economy 4 = with clock function 5 = heating for air conditioning 6 = gas-assisted*		1	
	d3	2	Delay of compressor/solenoid valve after defrosting (min)		0.0	
	d4	2	Start-up time of fan after defrosting Start-up delay of fan after defrosting (min) Neutral zone for heating/cooling	d1 = 1 d1 = 0 d2 = 5	0.0 0.0 0.0	
	d5	2	End of defrosting temperature (°C) Delta – heating (°C)	d1 = 1 d2 = 5	5.0 5.0	
	d6	2	Maximum duration of defrosting (min)		30	
	d7	2	*0 = deactivated* *1-999 = if the total start-up time of the compressor/solenoid valve since the most recent defrosting is shorter than this value, the next defrosting operation will be ignored*		0	

	d8	2	Start of defrosting no. 1 (HH:M)		0.0	
	d9	2	Start of defrosting no. 2 (HH:M)		6.0	
	d10	2	Start of defrosting no. 3 (HH:M)		12.0	
	d11	2	Start of defrosting no. 4 (HH:M)		18.0	
	d12	2	Start of defrosting no. 5 (HH:M)		0.0	
	d13	2	Start of defrosting no. 6 (HH:M)		0.0	
	d14	2	Lower limit on evaporator alarm temperature (°C)		-45	
	d15	2	Upper limit on evaporator alarm temperature (°C)		15.0	
	d16	2	Alarm delay (min)		30.0	
	d17	2	Zonal defrosting controlled by the central unit *0 = deactivated 1 = activated*		0.0	
	d18	2	Number of defrosting zone (0 – 31)	d17 = 1	255.0	
	d19	2	Await end of other defrosting operations in the zone *0 = deactivated 1 = activated*	d17 = 1	255.0	

Fans	U1	2	Operation of fan *0 = tripped during defrosting 1 = permanently in service* *2 = controlled with valve 3 = controlled with evaporator probe*		0	
	U2	2	Start-up temperature of fan (°C)	U1 = 3	-15	
	U3	2	Trip temperature of fan (°C)	U1 = 3	-10	

Analogue output	b1	3	Operation of analogue output *0 =proportional to ambient temp. 1 = PI regulation of ambient temp.* *2 = electronic pressure reducer*		0	
	b2	2	Analogue output – temperature corresponding to 0% (°C) Proportional coefficient for PI regulation (%)	b1 = 0 b1 = 1	-25 20	
	b3	2	Analogue output – temperature corresponding to 100% (°C) Integration coefficient for PI regulation (%)	b1 = 0 b1 = 1	-15 20	

Probe C	C1	3	Is probe C present? *0 = no, 1 = yes*		0	
	C2	2	Lower alarm limit (°C)		0.0	
	C3	2	Upper alarm limit (°C)		10.0	
	C4	2	Alarm delay (min)		30.0	
	C5	2	Significance of probe C in the estimation of the product temp. (%)	C1 = 1	0	
	C6	2	Alarm limit for Probe C *0 = absolute value 1 = relative to setpoint*		0	

	L3	2	Capacity of evaporator (KVA)		5.0	

Contacts C1, C2	F1	3	Function of contact C1 *0 = alarm upon closure 1 = alarm upon opening 2 = shutdown of unit* *3 = none 4 = setpoint offset upon closure 5 = door contact*		5	
	F2	2	Alarm delay on contact C1 (min)	F1 = 0, 1, 5	5.0	
	F3	2	*0 = deactivated* *1 – 99.9 = delay to start-up of compressor/solenoid valve after door closure*	F1 = 5	0.5	
	F4	3	Function of contact C2 *0 = alarm upon closure 1 = alarm upon opening 2 = shutdown of unit* *3 = none 4 = setpoint offset upon closure 5 = defrosting pulse* *6 = monitoring of defrosting on supplementary evaporators*		0	
	F5	2	Alarm delay on contact C2 (min)	F4 = 0 or 1	30.0	

Miscellaneous settings	r2	2	Value displayed in normal operation *0 = probe A 1 = probe B 2 = probe C 3 = product temperature* *5 = time (**DI24DE and DI24EE only**) 6 = pressure 7 = overheat* *8 = opening of pressure reducer*		0	
	r3	2	Display during defrosting *0 = probe A 1 = probe B 3 = product temperature* *4 = "dEG" message*		0	
	r4	2	Special functions *0 = normal operation 1 = complete shutdown 2 = override operation* *3 = override defrost*		0	
	r5	2	Correction of ambient temperature probe (°C)		0.0	
	r6	2	Correction of evaporator probe (°C)		0.0	
	r7	2	Correction of probe C (°C)		0.0	
	r8	3	Level 1 password (user)		0.0	
	r9	3	Level 2 password (operating engineer)		0.0	

	r10	3	Level 3 password (installer)		0.0	
	r11	3	Language *0 = French 1 = English 2 = German 3 = Italian 4 = Spanish*		1	

Time, date	H1	1	Hour setting		10	
	H2	1	Minutes setting		25	
	H3	2	Day of the month setting		6	
	H4	2	Month setting		5	
	H5	2	Year setting		5	
	H6	2	Day of the week setting		4	

Alarm codes for the management of cooling units and the management of multiple evaporators

	Alarm codes	
Alarms	1	Excessively low ambient temperature
	2	Excessively high ambient temperature
	3	Excessively low evaporator temperature
	4	Excessively high evaporator temperature
	5	Excessively low probe C temperature
	6	Excessively high probe C temperature
	7	Fault on probe A
	8	Fault on probe A
	9	Fault on probe B
	10	Fault on probe E (for DI24EE5)
	11	Fault on probe C
	12	Fault on intake pressure sensor
	13	Alarm on contact C1
	14	Alarm on contact C2
	15	End of defrosting temperature not achieved
	16	Fault on one of the slave units

Mode of operation for the management of evaporators

Basic configuration 

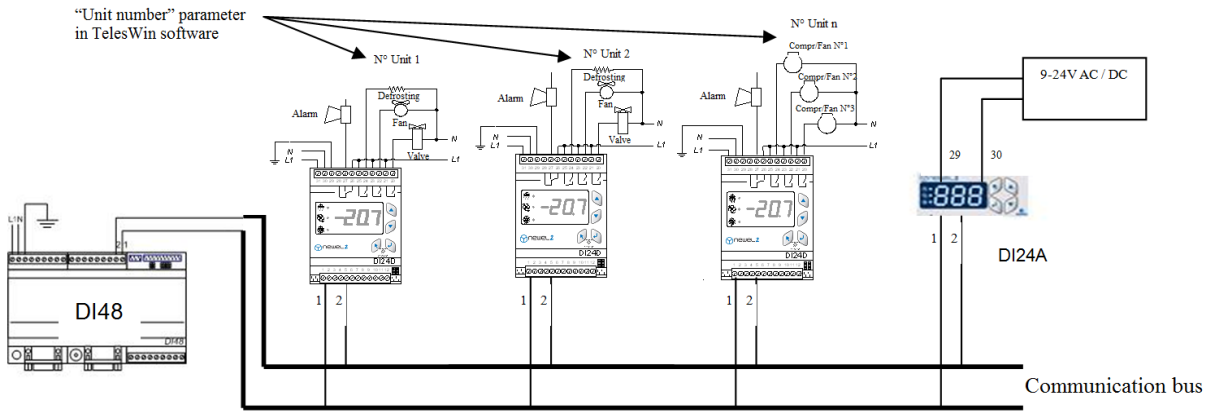
Symbol	Level	Function	Comment	Default value	Value applied
PAS	0	Password		0	
r1	3	Mode of operation *0 = cooling unit 1 = Management of compressors 2 = Universal regulation 3 = Monitoring 4 = Management of evaporators 2, 3, etc.*		4	
r20	3	Type of regulation *0 = negative unit 1 = positive unit*	r1 = 4		

Parameters 

	Symbol	Level	Function	Comment	Default value	Value applied
	PAS	0	Password		0	
Temp.	t5	2	Lower alarm limit on evaporator 2 (°C)		-45	
	t6	2	Upper alarm limit on evaporator 2 (°C)		15	
	t7	2	Alarm delay on evaporator 2 (min)		30	
Defrosting	d1	3	Is probe B present? *0 = no, 1 = yes*		1	
	d5	2	End of defrosting temperature (°C)		10	
	d6	2	Maximum duration of defrosting (min)		30	
	d14	3	Lower alarm limit on evaporator 3 (°C)		-45	
	d15	2	Upper alarm limit on evaporator 3 (°C)		15	
	d16	2	Alarm delay on evaporator 3 (min)		30	
Probe C	C1	3	Is probe C present? *0 = no, 1 = yes*		1	
	C2	2	Lower alarm limit on evaporator 4 (°C)		-45	
	C3	2	Upper alarm limit on evaporator 4 (°C)		15	
	C4	2	Alarm delay (min)		-45	
Cont. C1	F1	3	Function of contact C1 *0 = alarm upon closure 1 = alarm upon opening 2 = shutdown of unit 3 = none*		0	
	F2	2	Alarm delay (min)	F1 = 0 or 1	10	
Misc. settings	r5	2	Correction of evaporator probe no. 2 (°C)		0	
	r6	2	Correction of evaporator probe no. 3 (°C)		0	
	r7	2	Correction of evaporator probe no. 4 (°C)		0	
	r8	3	Level 1 password (user)		0	
	r9	3	Level 2 password (operating engineer)		0	
	r10	3	Level 3 password (installer)		0	
Alarms	A1C	2	Code of most recent alarm			
	A1d	2	Date of most recent alarm			
	A1b	2	Month of most recent alarm			
	A1H	2	Hour of most recent alarm			
	A1M	2	Minute of most recent alarm			
	A2C	2	Code for last alarm but one			
	A2d	2	Date of last alarm but one			
	A2b	2	Month of last alarm but one			
	A2H	2	Hour of last alarm but one			
	A2M	2	Minute of last alarm but one			
	A…C		etc., up to 5 alarms			

DI24A remote display

The DI24A display forms part of the NEWEL 2 range, and is connected to the communication bus in the same way as all the other modules.



If it is to operate correctly, the DI24A must be connected to a bus, comprising a central unit (DI48) and one or more regulation modules (DI24).

The "Unit number" parameter in the TelesWin software is used for the assignment of a unique number (between 1 and 255) to each regulation module.

On the DI24A display, the parameter "A1" defines the number of the unit to be displayed, while the parameter "A2" indicates the probe or sensor to be displayed.

Example: A1 = 3 and A2 = 0; the DI24A will display the value for probe A (ambient temperature) in the module for which the "Unit number" parameter has been set to 3.

The module comprises 3 parameters, which may be programmed using programming keys.

Parameters:

A1: Number of unit to be displayed

A2: Value displayed: 0 = probe A
1 = probe B
2 = probe C
3 = 4/20 mA sensor (pressure, hygrometry, etc.)

r9: Password

Alarm: In case of an alarm on the corresponding unit, the display will flash

Important: *The DI24A module will display "---", if communication with the corresponding unit is not possible.*

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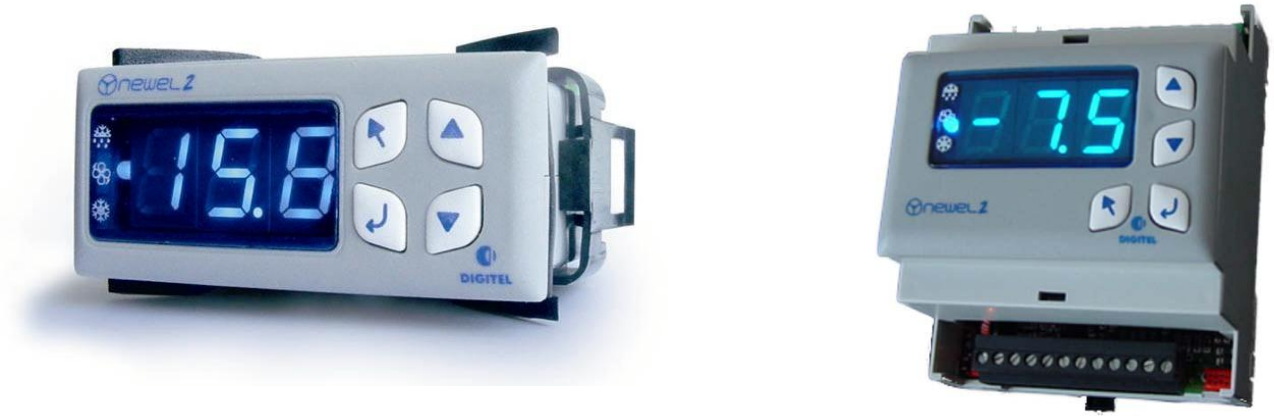


User Manual

REGULATION OF HEATER CALBES FOR WINDOW DISPLAYS

File: régulation des cordons chauffants des vitrines.doc
20/08/2009

1. Introduction

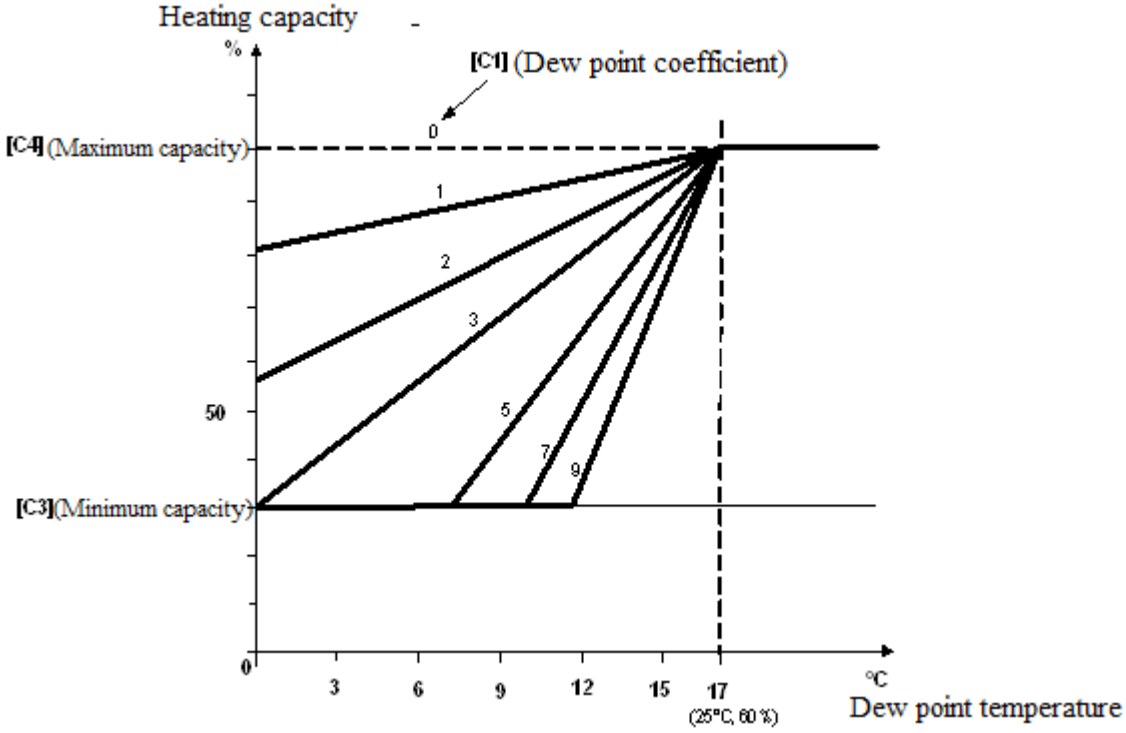
It is assumed that the reader of this document will previously have read the manual entitled "Introduction". The latter describes all the basic concepts which are essential to an understanding of the present document, and of the concept of the NEWEL2 product range in general.

This manual describes the operation of modules ***DI24D-TP*** *(DIN rail-mounted housing) and* ***DI24E-TP*** *(embedded housing) which are used for the* ***regulation of heater cables in window displays.***

2. General description. Basic connections

The windows and handrails of refrigeration cabinets are heated in order to prevent the formation of condensation and frost on their surfaces. Constructors will calculate the capacity of heater cables which will be sufficiently high to prevent the formation of condensation under the least favourable conditions (temperature of 25°C and relative humidity of 60%). In European climates, the occurrence of these extreme conditions will be relatively rare, generally restricted to no more than a few days each year. For the remainder of the time, where the temperature and humidity are lower, the heating system installed in the plant will be too powerful, and will consume excessive quantities of energy for no good purpose.

The DI24D-TP module reduces the capacity of the heating system to the minimum value required. It measures the ambient temperature and humidity, calculates the dew point temperature and adjusts the capacity of heater cables. The lower the calculated dew point, the greater the reduction in the heating capacity. The exact relationship between the dew point and the requisite heating capacity will depend upon the construction of the cabinet and the temperature of products. This relationship must be determined empirically for each type of cabinet. Parameter [C1] – "Dew point-capacity coefficient (0-9)" will allow the selection of one of ten possible relationships. The following diagram illustrates the movement in heating capacity as a function of the dew point, according to the coefficient selected.



Parameters [C3] and [C4] define the permissible range of capacity regulation. In case of a fault on one of the probes, the regulator will automatically deploy the maximum authorized capacity.

By programming these two parameters to the same value, the capacity will be fixed, regardless of temperature and humidity measurements. In this case, probes A and D will no longer be mandatory.

The connection circuit layout is shown in Figure 1. Regulation is achieved by the variation of the closing time of the triac thyristor for the control of capacity over a period of 50 seconds (PWM regulation). A single triac thyristor can control a number of heater cables on a number of cabinets. Where the total capacity exceeds the maximum loads of the triac thyristor, a number of triac thyristors (up to a maximum of 10) may be controlled in parallel by the same DI24D-TP regulator.

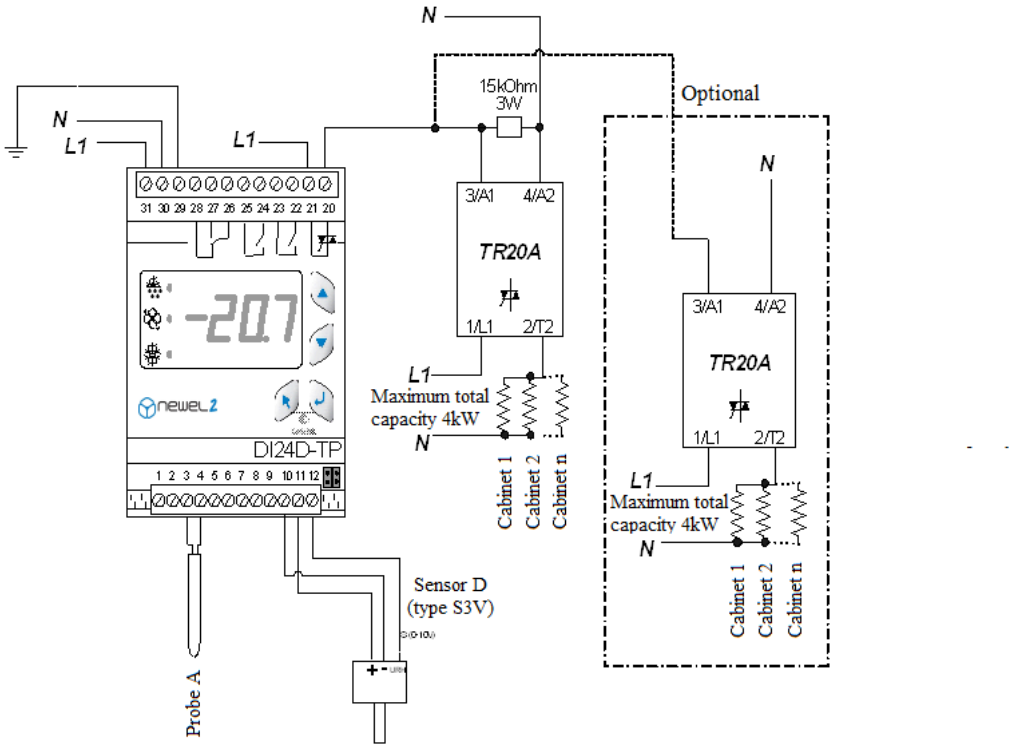


Figure 1: DI24D-TP

In larger installations, cabinets may be grouped according to type. In this case, each group will be controlled by a separate regulator with the optimum [C1] regulator for the type of cabinets concerned. The humidity probe may be shared between a maximum of 8 regulators, in accordance with the circuit layout shown in Figure 2.

The group number for each regulator will be programmed in parameter [C1]. Where regulators are connected to the central remote management unit (DI48), start-up functions for the various groups will be staggered over time, in order to prevent any peaks in consumption.

The following table shows a number of examples for the programming of parameter [C1], according to the category of cabinets concerned.

Freezer cabinets with door closure	1-2
Glazed freezer cabinets	2-5
Self-service patisserie & meat cabinets	4-7

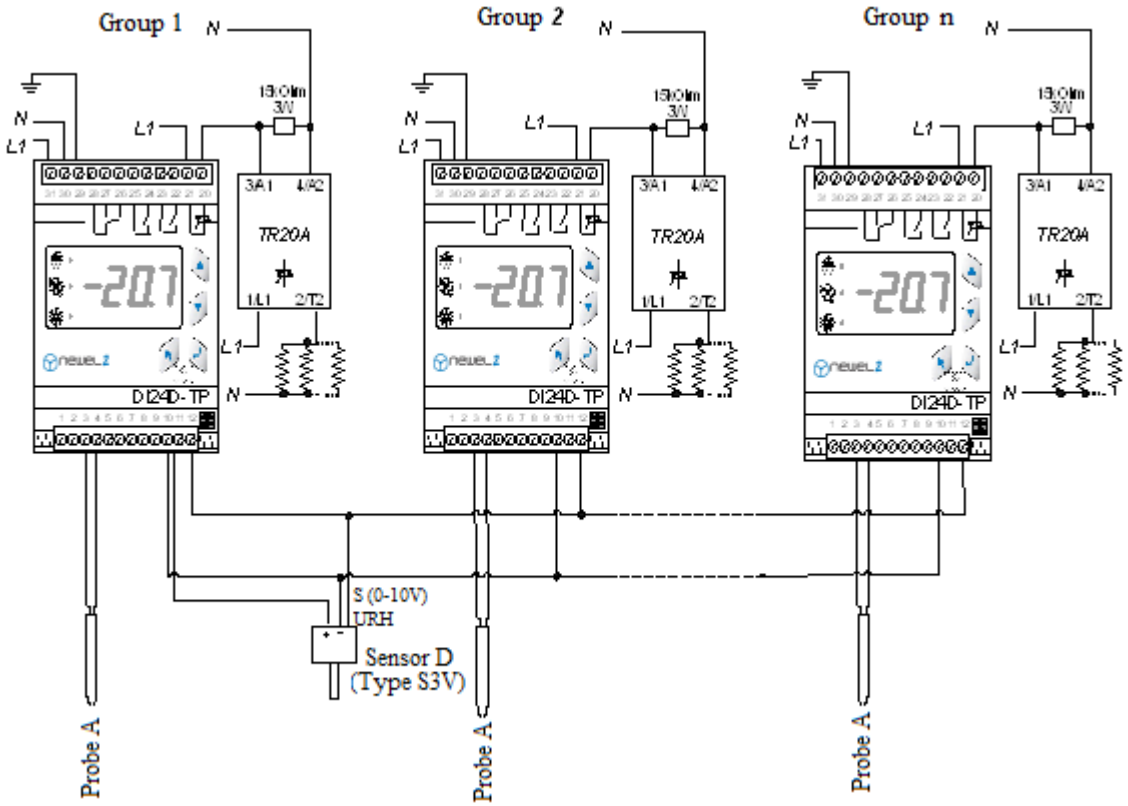


Figure 2: DI24D-TP group

[C1] Dew point – capacity coefficient (0-9)
[C2] Group number
[C3] Minimum heating capacity
[C4] Maximum heating capacity

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User Manual

MANGEMENT OF CENTRAL UNITS FOR COMPRESSORS AND CONDENSERS

Digitel reserves the right to modify the technical characteristics described without prior notice.
Non-contractual document

File: f_centrale compr et cond_newel2.doc
20/02/2008

Table of Contents

1. *Introduction*

☝ *It is assumed that the reader of this document will previously have read the manual entitled "Introduction". The latter describes all the basic concepts which are essential to an understanding of the present document, and of the concept of the NEWEL2 product range in general.*

This manual describes the operation of satellite units for the ***regulation of central compressor and condenser units****. In this case, parameter* ***[r1] in the basic configuration will be programmed to 1.***

2. *General description. Basic connections*

Connections will be completed in accordance with the circuit layout shown in Figures 1 and 2.

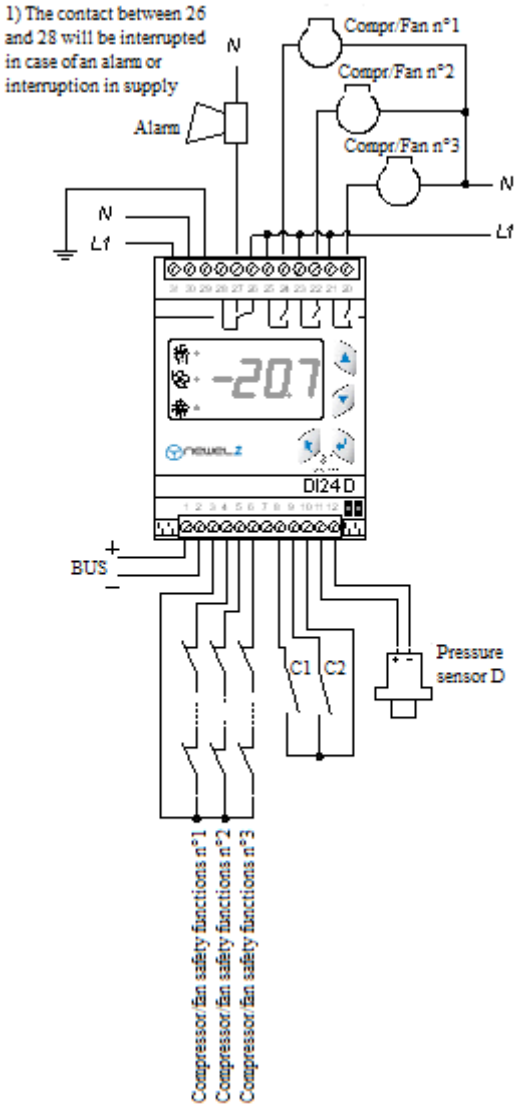
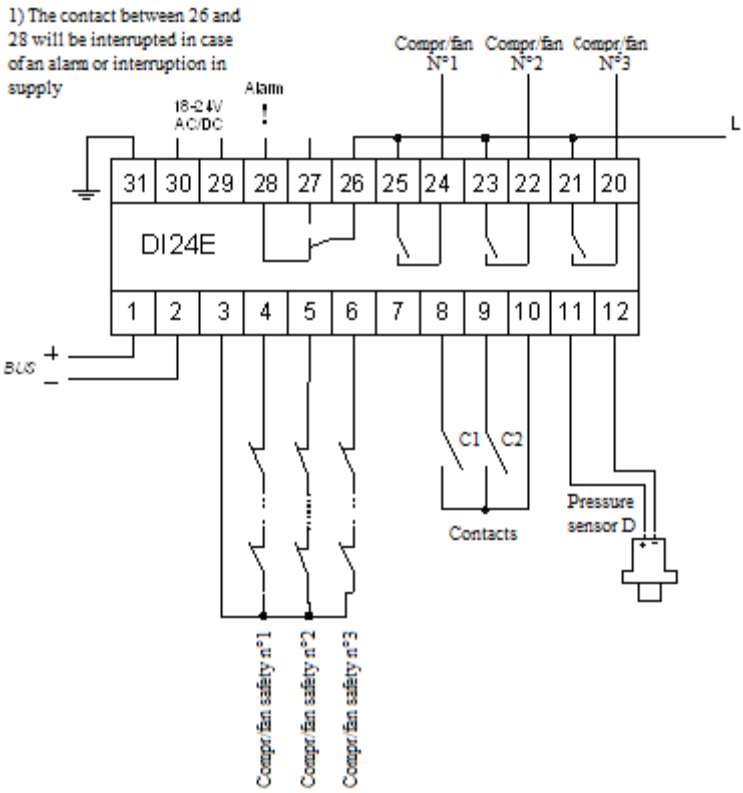


Figure 1: DI24D

Figure 2: DI24E



Satellite units will have the capability for the management of central units for compressors (parameter **[cF2]** set to zero in the basic configuration of the module) and condensers (**[cF2]** set to 1). In the interests of simplicity, we will generally describe the management of central units for compressors (low pressure).

[cF2] Type of regulation (*Mode of operation*)

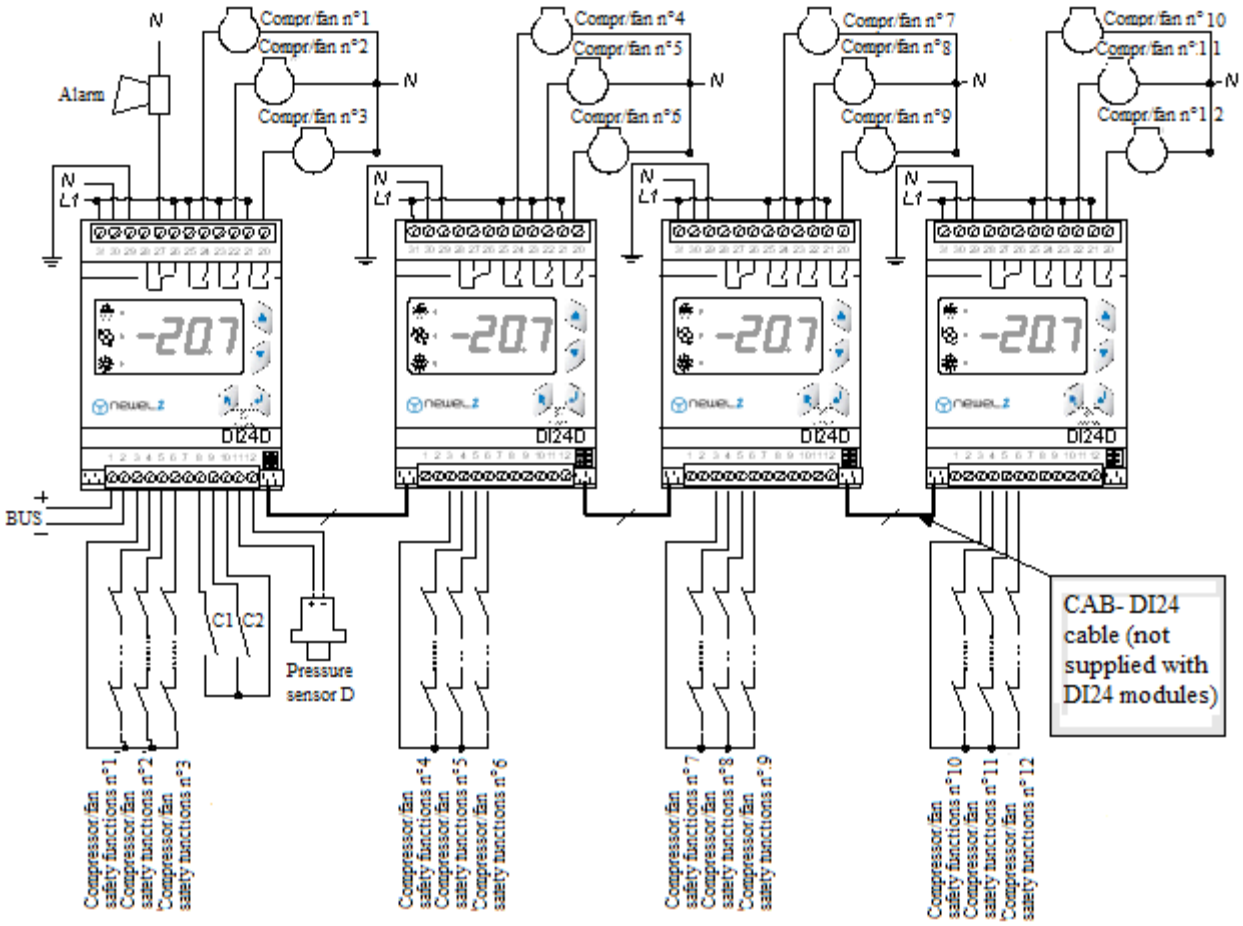
However, the principles described will also be applicable for the management of condensers. Any significant difference between these two modes of operation will be specifically indicated.

Pressure will be measured by a sensor with a 4-20 mA output.

A digital input will be assigned to each compressor, for the monitoring of its associated safety system (e.g. terminal 5 for compressor no. 2).

The functions of contacts C1 and C2 will be programmable. These may function as alarm contacts, setpoint offset contacts, load-shedding contacts or contacts for the complete shutdown of the unit (see Chapter 11).

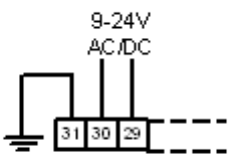
A satellite unit can manage up to 3 compressors. For the control of a larger number of compressors, a number of satellite units (up to a maximum of 4) may be arranged in series, in the circuit layout shown below, using a CAB- DI24 ribbon cable. The main satellite unit is also described as the "master" unit. The two straps on the module are used for the programming of the addresses of modules, upon the connection of the latter using the ribbon cable. The pressure sensor is connected to the master unit only. Likewise, only contacts C1 and C2 on the master unit will be operational.



The DI24E cannot comprise more than 3 capacity stages

For larger capacities, the DI24D must be used, with the circuit layout shown above

Connections for DI24E module



The connection of the remaining terminals will be as per the DI24D

3. Addressing of modules

Master	Compressors 1-3	
Slave n°1	Compressors 4-6	

Slave n°2	Compressors 7-9	
Slave n°3	Compressors 10-12	

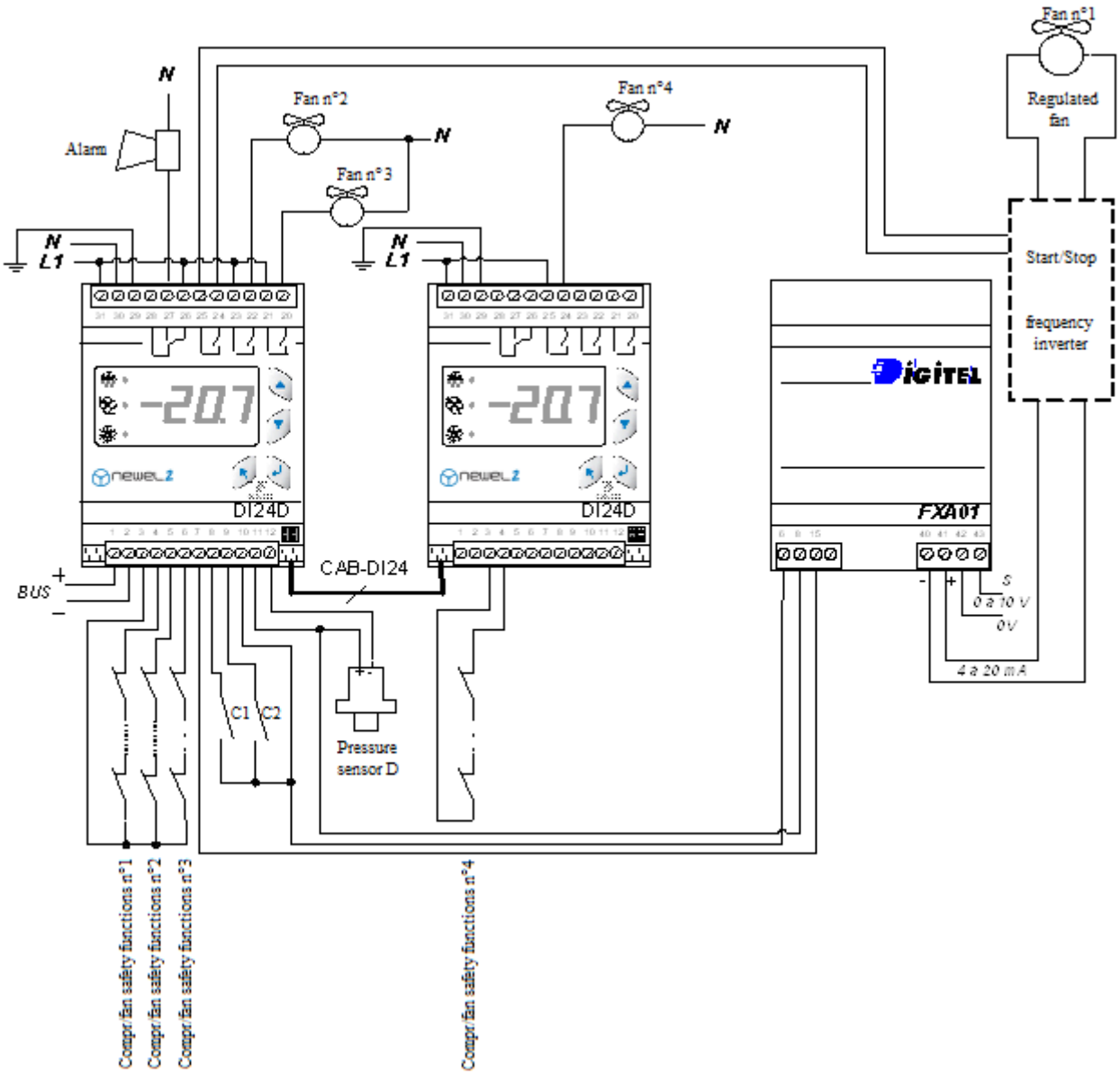
4. Principles of regulation

Conversely to conventional regulation systems, the regulation function in the NEWEL2 range will not await the achievement of consecutive pressure thresholds for the addition of capacity stages. By the constant monitoring of movements in pressure, this function will increase or reduce capacity in order to minimize the deviation between the programmed setpoint value and the measured pressure. This regulation function can manage the following units:

- 1-12 compressors in "on-off" mode
- 1-10 compressors equipped with a speed variation function and 0-12 "on-off" compressors
- 1-6 compressors with a pressure reduction function
- asymmetrical unit with 2-6 compressors of unequal capacity

4.1 Installation with speed variation

Variation of the speed of compressors or condenser fans will provide a high degree of accuracy in regulation, as it will permit the highly accurate adjustment of the capacity delivered in relation to the requirements of the installation. In many cases, the cost of a speed regulation function for all compressors or fans will not be acceptable, as the price of speed variators increases very substantially in proportion to their capacity. The NEWEL2 regulation function delivers an elegant solution to this problem, as it will permit the speed regulation of certain compressors or fans (1 or 2). All the remaining compressors will operate in "on-off" mode. Accordingly, the cost of the speed variator will be modest, as its capacity is restricted. The performance of the installation will not be compromised on the grounds that, by the control of a single compressor, the regulation function can deliver the accurate adjustment of the capacity delivered. Figure 3 shows an example of a condenser regulation function, in which 1 fan is regulated and the remaining fans are operating in "on-off" mode.

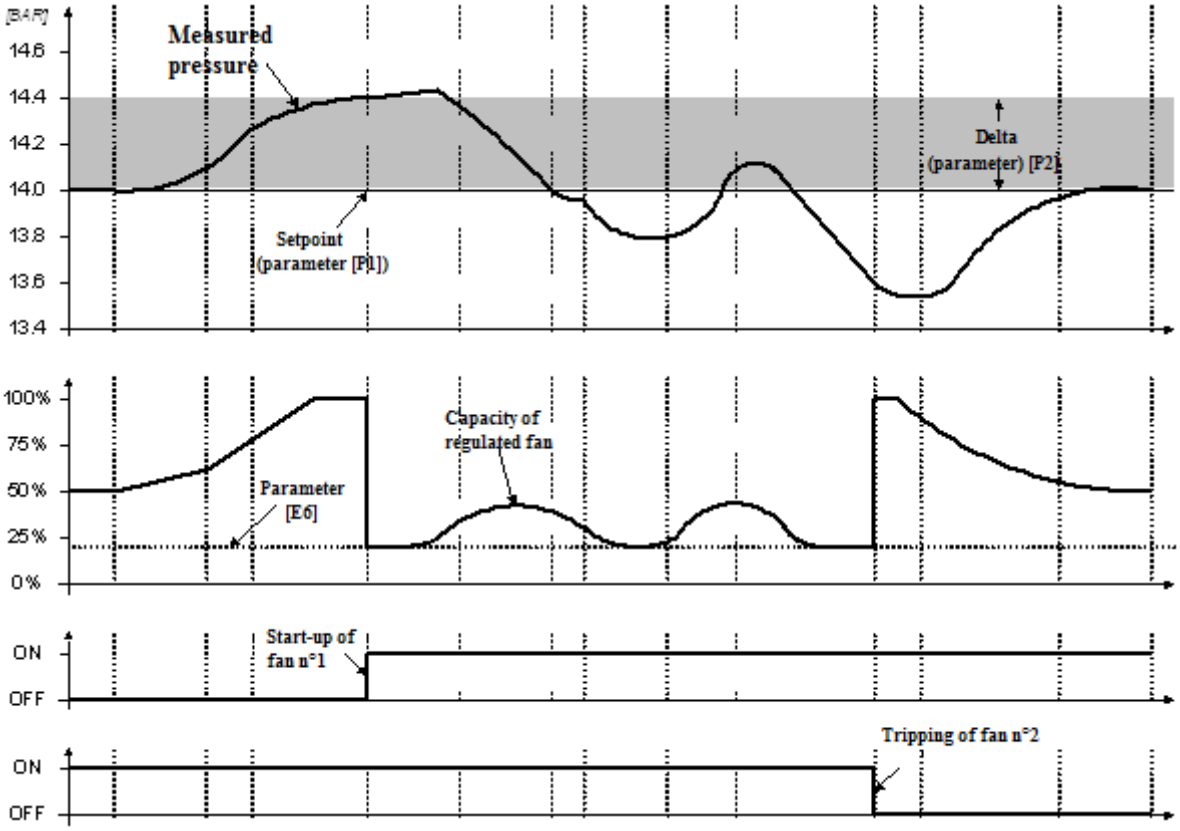


The device will calculate the deviation between the pressure and the setpoint value every 5 seconds. Where a positive deviation is detected, the speed of the regulated fans will be increased. The magnitude of this increase will be proportional to the value of the deviation concerned and inversely proportional to the value of parameter **[P8]**. The device will also take account of the number of regulated fans. The greater the number, the lower the increases applied. If the pressure exceeds the "neutral zone" of regulation (= **[P1] + [P2]**) and the regulated fans reach their maximum capacity, an additional non-regulated fan will start up. At the same time, the speed of the regulated fans will be reduced. The value of this reduction will correspond to the increase in capacity associated with the start-up of the non-regulated fan. Accordingly, this value will be inversely proportional to the number of regulated fans. For example, in the case of 2 regulated fans, the speed will be reduced by 50%, as this will correspond to the capacity of a single non-regulated fan.

If the capacity is still not sufficient to meet the requirements of the installation, increases in speed will resume, and the cycle will continue until the pressure begins to fall. Figure 4 shows a graphic representation of this function in a system comprising 2 "on-off" fans and 1 regulated fan.

[P1] Setpoint (*Regulation Menu*)
[P2] Delta (*Regulation Menu*)

[P8] Time delay for capacity increase (*Regulation Menu*)



The dynamic regulation function will be determined by parameters **[P2], [P8]** and **[P9]**. **[P2]** will indicate the "neutral zone" above the setpoint value. Non-regulated fans will retain their existing status, provided that the pressure remains within this zone. Parameter **[P8]** defines the delay in the consecutive start-up of non-regulated fans, should the pressure exceed the neutral zone by no more than 0.1 bar. The greater the excess pressure, the shorter these time delays will be in proportion. By the same principle, parameter **[P9]** will determine time delays for the consecutive tripping of fans. Accordingly, this parameter will influence the rate of capacity reduction. In general, the reduction of values for **[P2], [P8]** and **[P9]** will enhance the accuracy of regulation, but will involve more frequent switching operations. An increase in these values will result in greater deviations and a reduction in the number of start-ups and trips.

The module will observe the rate of change in pressure. Where the pressure rises rapidly, increases in speed will be greater and, in consequence, the start-up of additional fans will proceed more rapidly. The influence of this effect is programmable between 0 and 99 in parameter **[P11].** A value of zero will eliminate this function. A value of 99 will generate extreme responses to pressure variations. The device will also be capable of offsetting minor and persistent pressure deviations (integration function). The influence of this function is determined by the integration coefficient (parameter **[P10]**), which is programmable between 0 and 99. Parameters **[P10]** and **[P11]** must be handled with care. We would advise that these parameters be left in the vicinity of the values proposed in the programming data sheets ("P10" = 10, "P11" = 20).

If the pressure deviation becomes negative, the cycle will be reversed. The speed of the regulated fans will be reduced and, where this speed achieves the minimum value programmed for parameter **[E6]**, one "on-off" fan will be tripped. The capacity of the regulated fans will then be increased.

[P2] Delta (*Regulation Menu*)
[P8] Time delay for capacity increase (*Regulation Menu*)
[P9] Time delay for capacity reduction (*Regulation Menu*)
[P11] Differential coefficient (*Regulation Menu*)
[P10] Integration coefficient (*Regulation Menu*)
[E6] Minimum capacity of speed variator (*Security Menu*)

The selection of the fan to be started up or tripped will depend upon the value of parameter **[L1]**. Where this value is zero, the fan which has been tripped for the longest duration will start up on a priority basis, and the fan which has been in service for the longest time will be tripped on a priority basis. In the long term, this will ensure the equalization of the service time of fans. Where the value of **[L1]** is set to 1, fans will start up in rising number order and will trip in descending number order. For example, in case of an increase in capacity, fan no. 1 will start up first, followed by no. 2, no. 3 etc. and, in case of a decrease in capacity, fan no. 3 will trip first, followed by no. 2 and no. 1.

The principles of regulation described above for condenser fans will also apply to the compressors of a refrigeration unit.

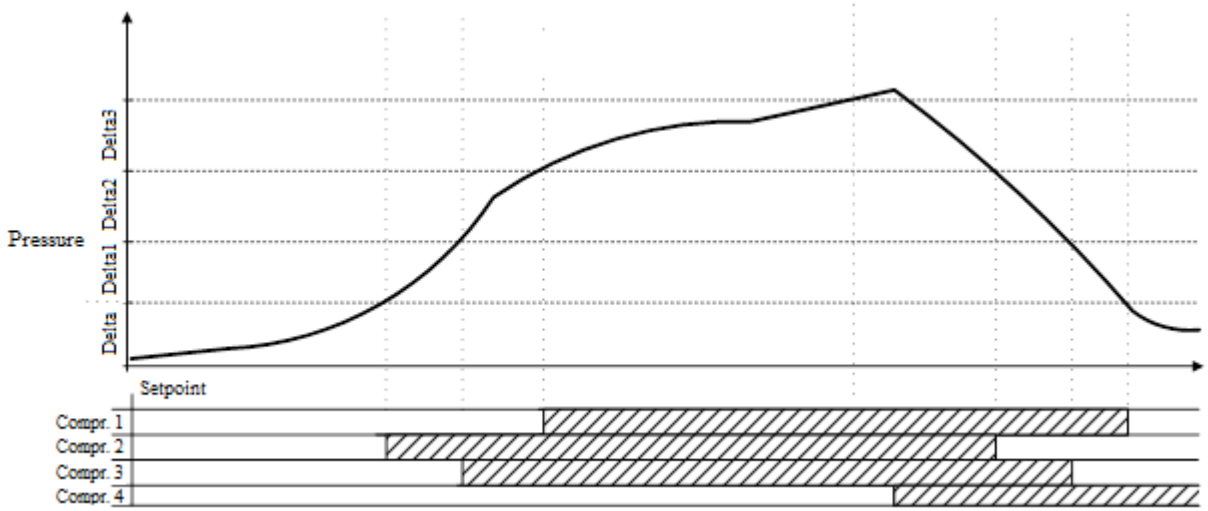
4.2 Operation without speed variation.

In the absence of a speed variator (with all fans or compressors operating in "on-off" mode), an analogue regulation process will apply. The only difference stems from the fact that speed variations are purely notional, and will have no physical effect.

4.3 Regulation by stages

In rare cases, specifically in installations with refrigeration circuits of small capacity, PID regulation may generate the excessive start-up/tripping of compressors. Conventional regulation by stages may be more appropriate in this case.

For the programming of regulation by stages, it will be necessary to adjust parameter **[L8]** to 2, and to adjust the values of parameters **[P2], [L9]** and **[L10]** to achieve the desired delta values. The following diagram shows an example of a start-up/trip cycle for compressors which are managed by regulation in stages.



In this mode of regulation, the "anti-short-cycle" function will be operational. The rotation of compressors will also be ensured (for the equalization of the service time of compressors).

[L1] Selection of compressor/fan to be switched (*Configuration Menu*)
[L8] Specific configuration for type of regulation
[P2] Selection of delta
[L9] Selection of delta 2 where [L8] is 2
[L10] Selection of delta 3 where [L8] is 2

4.4 Management of compressors with capacity reduction

The NEWEL2 regulation function is capable of managing central compressor units with a capacity reduction facility. The number of capacity stages may be as high as 12. The following diagram shows the connection of motors and reduction valves for 2 pressure levels (1 reduction cylinder).

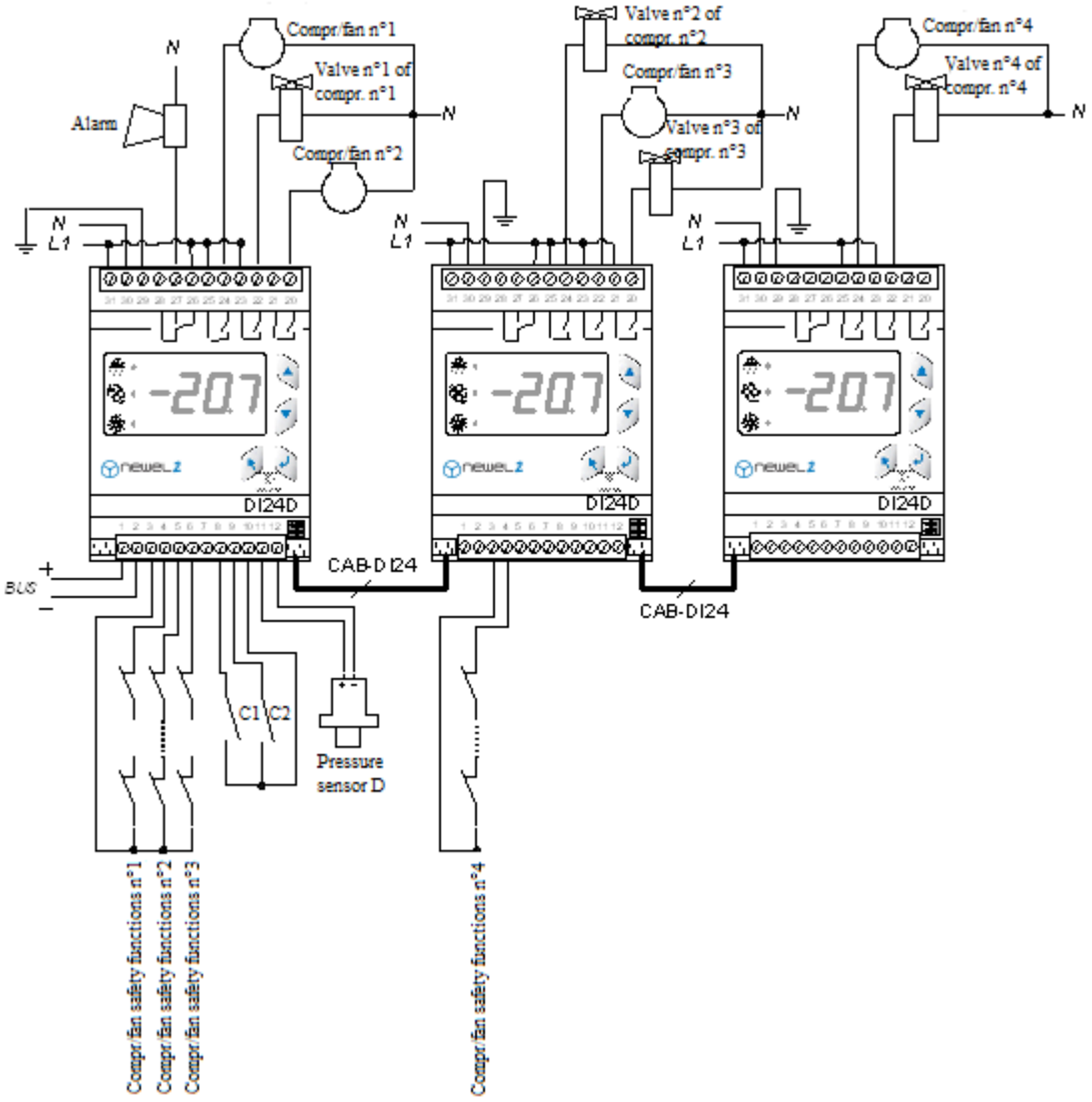


Figure 5 describes the assignment of outputs for motors and reduction valves associated with various numbers of capacity stages.

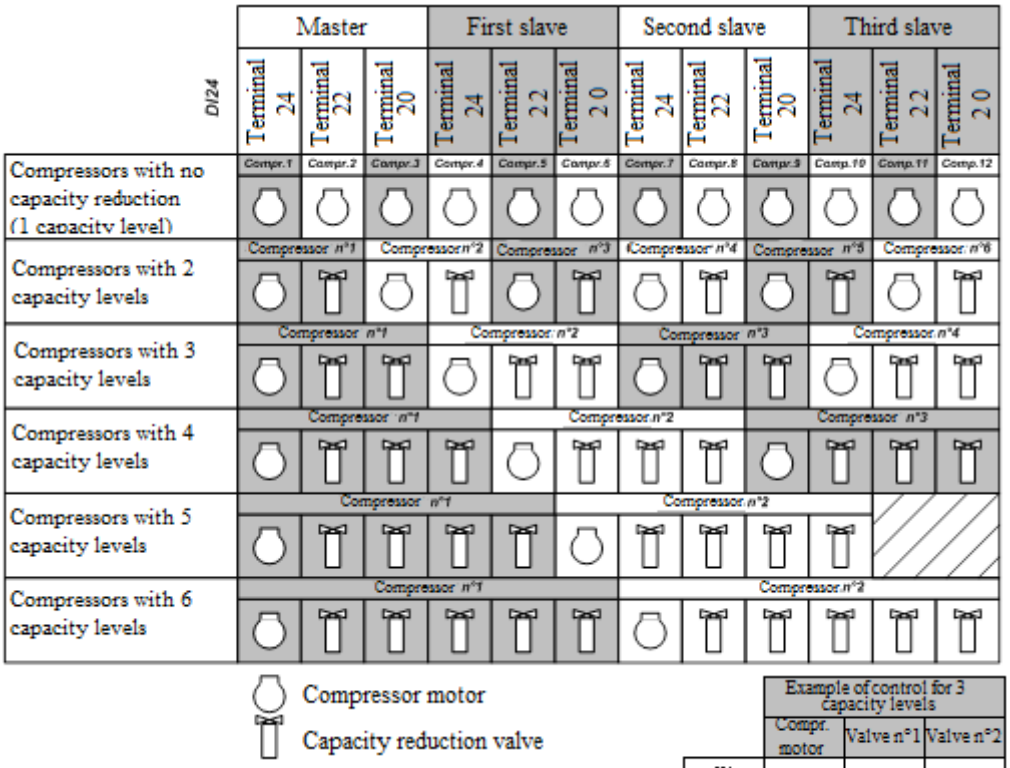


Figure 5
File : F_Tableau Vane de Réd.vsd

The regulation procedure is similar. The only difference occurs in the selection of "on-off" outputs for the incremental increase or decrease in capacity.
If the capacity is to be increased, the device will prefer the addition of a cylinder on a compressor which is already in service to the start-up of an additional compressor.
Likewise, for a decrease in capacity, the procedure applied should involve the minimum possible number of compressors in service.
In practice, the algorithm for the selection of outputs is complex. This algorithm will also take account of the service time of compressors, will minimize operating time at reduced capacity and will attempt to ensure the optimum availability of the capacity required to meet any increases in capacity demand.

4.5 Management of compressors of unequal capacity

In certain cases, the capacity differentiation of compressors in the same central unit may be appropriate. This will provide an option for the reduction of increments for the increase or decrease of capacity, thereby allowing the more effective adaptation of the capacity of compressors to the requirements of the installation. As shown in Figure 6, a central unit comprised of 3 compressors of respective capacity 1.5, 3.9 and 4.5 kW can deliver 6 different capacity levels. With compressors of equal capacity, only 3 capacity levels will be available

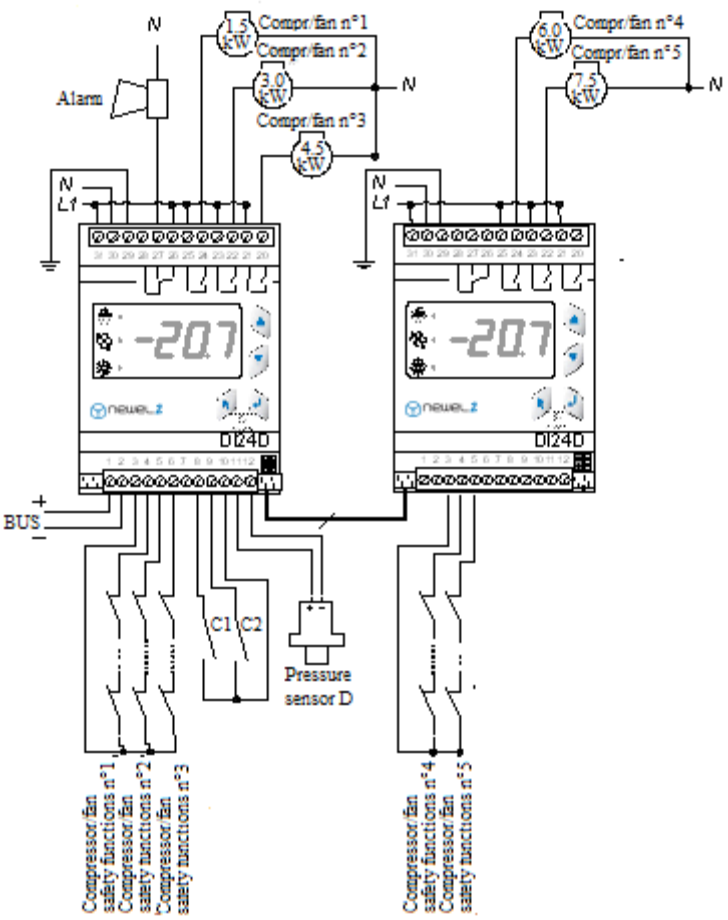
Figure 6
File: F_Tableau Centrale Ass.vsd

With parameter **[L7]** programmed to 1, the NEWEL2 module can be adapted to this type of central unit. It can be used for the management of 2 – 6 compressors of unequal capacity. The distribution of different

capacity levels will be optimum where the capacity of successive compressors increases by a constant value which is equal to the capacity of the smallest compressor. For example, where the capacity of the smallest compressor is 1.5 kW, successive compressors will ideally have capacities of 3.0, 4.5, 6.0, 7.5, etc.

Load-shedding and service time equalization functions will be inoperative.

Given that, in this type of control, the module has no free choice of the compressor to be started up, there may be substantial differences in the number of start-ups for the various compressors concerned. In this mode of regulation, the "anti-short-cycle" protection function will be inoperative. In consequence, it is important to avoid the excessively low programming of values for parameters **[P8]** and **[P9]**. This may result in excessively frequent switching operations and the shortening of the service life of compressors.



[L7] Type of central unit (*Configuration Menu*)
[P8] Time delay for capacity increase (*Regulation Menu*)
[P9] Time delay for capacity decrease (*Regulation Menu*)

4.6` Condensers with multiple refrigeration circuits

For the management of condensers with multiple refrigeration circuits, a FX-AD3P module will be added. At its output, this module will relay the strongest of the signals generated by the 3 pressure sensors (see Figure 8). In consequence, the condenser will be controlled by the circuit with the highest pressure.

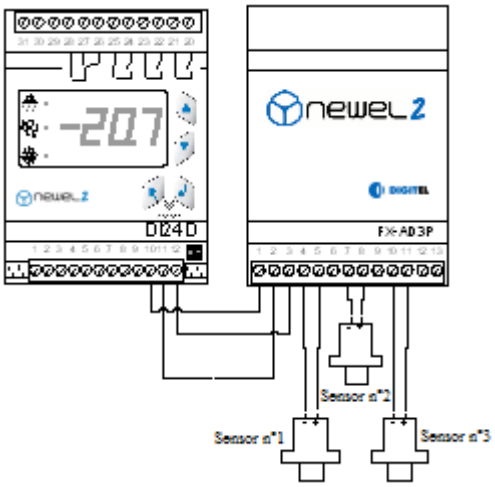


Figure 8

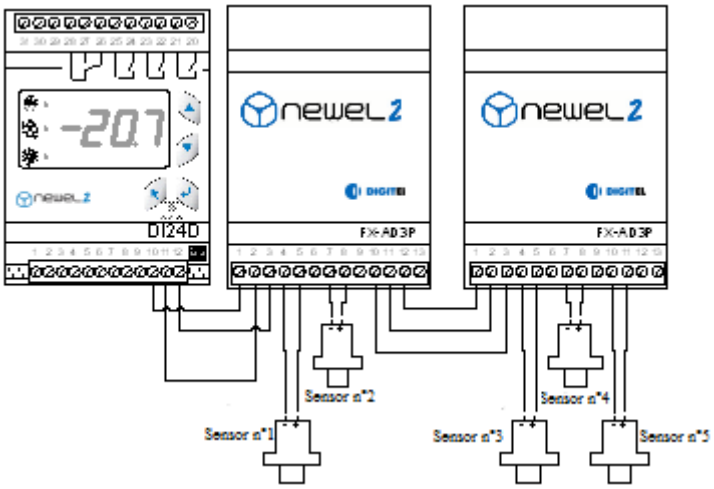


Figure 9

Where the number of circuits is greater than 3, a number of modules may be operated in a cascade arrangement, in order to allow the connection of the requisite number of sensors (see Figure 9).

4.7 Chilled water units. Regulation using a temperature probe

In chilled water units, the pressure sensor will be replaced by a temperature probe with a 4-20 mA output, in accordance with the circuit arrangement shown in Figure 10.

The programming of the basic configuration for the module must be compliant with the following rules:

- Parameter **[cF3]** will be programmed to 1 (°C), and all pressure parameters will be entered in °C
- Parameter **[cF4]** will be programmed to 10 (chilled water)
- **[o1]** and **[o2]** will be set to 0.0 and 25.0 respectively.

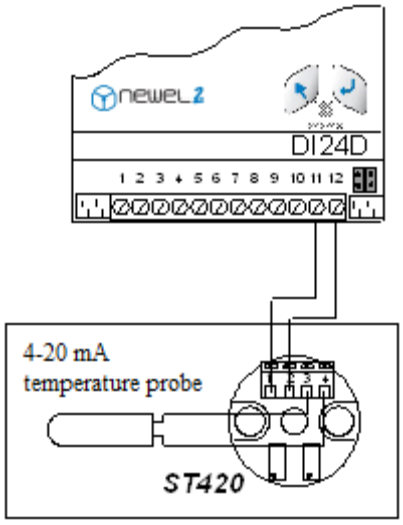


Figure 10 *File: F_Sonde Temp 4-20mA*

5. Restriction of number of start-ups (anti-short-cycle function)

Compressor manufacturers will only authorize a limited number of start-ups per hour. This number will be programmed in parameter **[E5]**. In order to ensure compliance with this constraint, the module will ensure that the time interval between two successive start-ups of the compressor is greater than 60 minutes, divided by the value of parameter **[E5]**.

The "anti-short-cycle" protection function will be inoperative where parameter **[L1]** = 1 (always in the same order) and where parameter **[L7]** = 1 (asymmetrical units).

In the case of modules for the management of condensers, parameter **[E5]** should be programmed to a relatively high value (30-40, subject to any counter-indication by the manufacturer), given that fans show a good capability for the accommodation of frequent start-ups). Excessively low values may result in HP faults associated with the delays described above.

6. Setpoint offset

Parameter **[P4]** will allow the selection of one of the following types of setpoint offset:

6.1 None ([P4=0])

The setpoint will remain fixed, at a value equal to parameter **[P1].**

6.2 Offset with clock function ([P4=1])

The setpoint determined by the value of parameter **[P1]** may be temporarily offset by a positive or negative value, which is programmable in parameter **[P5]**. This offset will be controlled by the clock function of the module within a given time interval, the start of which will be equal to the value of parameter **[P6]** and the end of which will be equal to the value of **[P7]**.

[cF3] Display unit (*Mode of operation*)
[cF4] Coolant fluid (*Mode of operation*)
[E5] Maximum number of start-ups per hour (*Security Menu*)
[L1] Selection of compressor/fan to be switched (*Configuration Menu*)
[L7] Type of central unit (*Configuration Menu*)
[o1] Range of measurement of sensor – lower limit (*Setting Mode*)
[o2] Range of measurement of sensor – upper limit (*Setting Mode*)
[P1] Setpoint (*Regulation Mode*)
[P4] Type of setpoint offset (*Regulation Mode*)
[P5] Setpoint offset (*Regulation Mode*)
[P6] Start of setpoint offset (*Regulation Mode*)
[P7] End of setpoint offset (*Regulation Mode*)

The same setpoint offset may be controlled by the closure of contacts C1 or C2, where the function of these contacts is programmed to 4 (see **parameters [o4] and [o5]**), or by the weekly schedule (see Chapter 11). The pressure alarm limits programmed in **[o1]** and **[o2]** will be offset at the same time and by the same value as the setpoint.

6.3 Floating HP ([P4=2])

By the reduction of the HP, where the exterior temperature is sufficiently low, the temperature of the fluid injected into the evaporator, together with the margin between the high pressure and low pressure, will be reduced. This will significantly improve the efficiency of the installation, resulting in substantial energy savings. The floating HP function will be activated by the programming of parameter **[P4]** to 2. The setpoint will follow changes in the exterior temperature. The regulator will maintain a fixed margin, determined by the value of parameter **[P5]**, between the setpoint and the exterior temperature. The setpoint will remain within the limits programmed for parameters **[P6]** and **[P7]**.

The exterior temperature will be measured by probe A on a separate DI24 module, which will operate in "cooling unit" mode. The "Circuit number" parameter for this module must be programmed to 30. No other module on the bus will have this parameter programmed to 30. The installation must be equipped with a DI48 central monitoring unit.

6.4 Floating LP ([P4=2])

With parameter [P4] programmed to 2, the LP regulation function will automatically record the pressure setpoint during periods of low refrigeration demand. This function is based upon the service time of all units forming part of the same refrigeration circuit. The setpoint value is continuously adapted to the requirements of the installation. In the interests of energy saving, this setpoint will be maintained at the highest possible value which is consistent with the correct operation of all units. Parameters [P6] and [P7] will allow the definition of upper and lower limits for the setpoint. The regulation function will maintain the setpoint within this range. The installation must be equipped with a DI48 central unit.

7. Load shedding

The load shedding function will allow the shutdown of one or more compressors, in order to reduce the capacity of the central unit. This function will be activated by the closure of Contact C1 or C2, where parameter **[o4]** or **[o6]** respectively is programmed to 5. Parameter **[E4]** will define the minimum number of compressors which will remain isolated from supply during load shedding. The maximum number of compressors which will remain in service will be equal to the total number of compressors, minus the value programmed for parameter **[E4]**.

[E4] Number of compressors isolated from supply during load shedding (*Security Menu*)
[E7] Maximum duration of operation (*Security Menu*)
[E8] Maximum duration of shutdown (*Security Menu*)
[F1] Operation of compressor n° 1 (*Commands Menu*)
…. ……
[F12] Operation of compressor n° 12 (*Commands Menu*)
[o1] Range of measurement of sensor – lower limit (*Setting Mode*)
[o2] Range of measurement of sensor – upper limit (*Setting Mode*)
[o4] Function of contact C1 (*Setting Mode*)
[o6] Function of contact C2 (*Setting Mode*)
[P4] Type of setpoint offset (*Regulation Mode*)
[P5] Offset in relation to exterior temperature (*Regulation Mode*)
[P6] Lower setpoint limit (*Regulation Mode*)
[P7] Upper setpoint limit (*Regulation Mode*)

8. Maximum operating times and rest times

Parameters **[E7]** and **[E8]** indicate the maximum operating time and the maximum rest time respectively. If one of the fans or compressors remains in service for a duration which exceeds the value of parameter **[E7]** (in hours), the device concerned will trip automatically and another device will start up in its place. Likewise, if the duration of the shutdown of a compressor or fan exceeds the value of parameter **[E8]**, the device concerned will start up and another device will be tripped. This will permit the systematic lubrication of all compressors and fans, and will equalize their service time.

9. Override operation and shutdown

Parameters **[F1]** and **[F12]** will permit the override operation (value 2) or override shutdown (value 1) of each compressor or fan, regardless of the measured pressure value.

10. Run-time meters

This module will totalize the operating time of each compressor and fan. The status of these meters may be displayed using "TelesWin" remote monitoring software.

11. C1, C2 contacts, safety functions

The functions of contacts C1 and C2 will be determined by parameters **[o4] and [o6]**. These may function as alarm contacts, setpoint offset contacts, load-shedding contacts or contacts for the complete shutdown of the unit.

A digital input will be assigned to each compressor, in order to permit the monitoring of the safety circuit of the latter (e.g. terminal 5 for compressor n° 2) – see Figure 1 [sic]. Habitually, the safety circuit will be comprised of "loss of phase", thermal detection or oil pressure switch contacts connected in series. An interruption in the circuit will result in the shutdown of the compressor and the triggering of an alarm.

Where the dictates of compressor protection so require, the monitoring of safety functions may be refined for the precise identification of the defective point in the circuit. This may be achieved by the inclusion of additional modules operating in "On-off input monitoring mode". In this mode, the slave unit will be provided with 5 digital inputs for the monitoring of various points in the safety circuit.

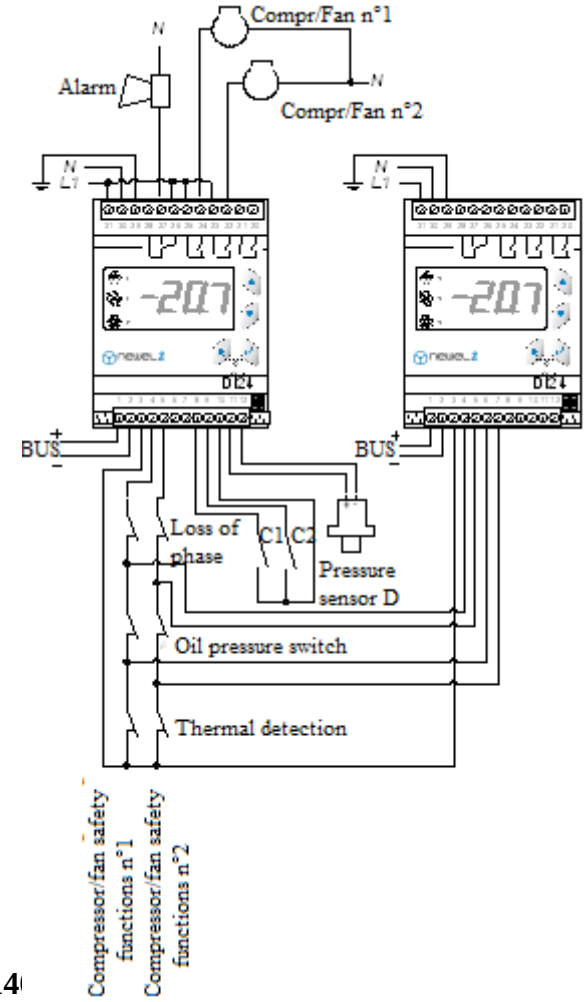
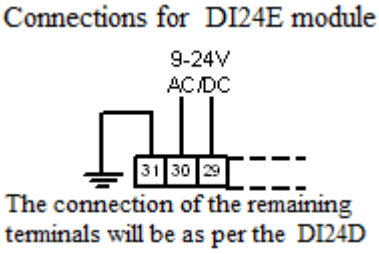


Figure 11



12. Weekly schedule

This option will only be available with central unit DI48

This option provides scope for the modification of the operation of the slave unit during periods of reduced activity, in accordance with a weekly schedule which is entered in the central remote monitoring unit (for example, hours of closure of supermarkets). Depending upon the programming of parameters in menu 5 ("Schedule" menu) during periods of closure, the slave unit may shut down all compressors or fans, or offset the pressure setpoint.

[o4] Function of contact C1 (*Setting Mode*)
[o6] Function of contact C2 (*Setting Mode*)

Mode of operation of compressor management

Basic configuration 

Symbol	*Level*	*Function*	*Comment*	*Default value*	*Value applied*
NONE	0	Password		0	
r1	3	Mode of operation *0 = cooling unit 1 = Management of compressors 2 = Universal regulation 3 = Monitoring 4 = Management of evaporators 2, 3, etc.*		1	
cF2	3	Type of regulation *0 = low pressure 1 = high pressure*	r1 = 1	0	
cF3	3	Display unit *0 = bar 1 = °C*	r1 = 1	1	
cF4	3	Coolant fluid *1 = R12 2 = R22 3 = R134A 4 = R502 5 = R500* *6 = MP39 7 = HP80 8 = R404A 9 = R717 (NH3) 10 = chilled water* *11 = R407 (fluid) 12 = R407 (gas/fluid) 13 = R23* *14 = R413A (ISCEON 49) 15 = R417A (ISCEON 59)* *16 = R422A (ISCEON 79) 17 = R507 (version 8151 onwards)* *18 = R744(CO2) (version 8151 onwards)*	r1 = 1	8	

Parameters 

	Symbol	*Level*	*Function*	*Comment*	*Default value*	*Value applied*
	NONE	0	Password		0	
Regulation	P1	2	Setpoint (°C/bar)		-15	
	P2	2	Delta (°C/bar). The device regulates between pressures p1 and p1+p2		3	
	P3	2	Pump-down limit (°C/bar) (shutdown of last compressor)	cF2 = 0	-18	
	P4	2	Type of setpoint offset *0 = none 1 = clock function or C1/C2 2 = floating HP/LP*		0	
	P5	2	Setpoint offset (°C/bar) Offset in relation to exterior temperature	P4 = 1 P4 = 2 & cF2 = 1	0 10.0	
	P6	2	Start of setpoint offset (HH.M) Lower setpoint limit (°C)	P4 = 1 P4 = 2	0 25.0	
	P7	2	End of setpoint offset (HH.M) Upper setpoint limit (°C)	P4 = 1 P4 = 2	0 35.0	
	P8	2	Time delay for capacity increase (min)		3	
	P9	2	Time delay for capacity reduction (min)		0.5	
	P10	2	Integration coefficient (%)		10	
	P11	2	Differential coefficient (%)		20	

Safety	E1	2	Lower alarm limit (°C/bar)		-25	
	E2	2	Upper alarm limit (°C/bar)		5	
	E3	2	Alarm delay (min)		30	
	E4	2	Number of compressors isolated from supply during load shedding		0	
	E5	2	Maximum number of start-ups per hour		5	
	E6	2	Minimum capacity of speed variator (%)		30	
	E7	2	Maximum duration of operation (h)		0	
	E8	2	Maximum duration of shutdown (h)		0	

Configuration	L1	2	Selection of compressor/fan to be switched *0 = according to operating time 1 = always in the same order*		0	
	L2	2	INTERACT-type management *0 = no, 1 = yes*		0	
	L4	2	Number of compressors/fans with no speed variation		3	
	L5	2	Number of capacity stages per compressor	cF2 = 0	1	
	L6	2	Number of compressors/fans with speed variation		0	
	L7	2	Type of central unit *0 = symmetrical 1 = asymmetrical*		0	
	L8	2	Special configuration *0 = none 1 = compressor n° 1 with speed variation 2 = regulation by stages*		0	
	L9	2	*Delta 2 (°C/bar) start-up of 2nd compressor*	L8 = 2	3	
	L10	2	*Delta3 (°C/bar) start-up of 3rd compressor*	L8 = 2	3	

Settings	o1	2	Range of measurement of pressure sensor – Lower limit (bar)		-1	
	o2	2	Range of measurement of pressure sensor – Upper limit (bar)		7	
	o3	2	Correction of pressure sensor (bar)		0	
	o4	2	Function of contact C1 *0 = alarm upon closure 3 = display* *1 = alarm upon opening 4 = setpoint offset upon contact closure* *2 = shutdown of all compressors 5 = load shedding upon contact closure*		0	
	o5	2	Alarm delay (min)	o4 = 0 or 1	30	
	o6	2	Function of contact C1 *0 = alarm upon closure 3 = display* *1 = alarm upon opening 4 = setpoint offset upon contact closure* *2 = shutdown of all compressors 5 = load shedding upon contact closure*		0	
	o7	2	Alarm delay (min)	o6 = 0 or 1	30	
	o8	2	Level 1 password (user)		0	
	o9	2	Level 2 password (operating engineer)		0	
	o10	2	Level 3 password (installer)		0	

Commands	F1	2	Operation of compressor n° 1 *0 = normal operation 1 = override shutdown 2 = override operation*		0	
	F2	2	Operation of compressor n° 2 *0 = normal operation 1 = override shutdown 2 = override operation*		0	
	F3	2	Operation of compressor n° 3 *0 = normal operation 1 = override shutdown 2 = override operation*		0	
	…	…	…			
	F10	2	Operation of compressor n° 10 *0 = normal operation 1 = override shutdown 2 = override operation*		0	
	F11	2	Operation of compressor n° 11 *0 = normal operation 1 = override shutdown 2 = override operation*		0	
	F12	2	Operation of compressor n° 12 *0 = normal operation 1 = override shutdown 2 = override operation*		0	

Time, date	H1	1	Hour setting		10	
	H2	1	Minutes setting		25	
	H3	2	Day of the month setting		6	
	H4	2	Month setting		5	
	H5	2	Year setting		5	
	H6	2	Day of the week setting		4	

Alarms	A1C	2	Code of most recent alarm
	A1d	2	Date of most recent alarm
	A1b	2	Month of most recent alarm
	A1H	2	Hour of most recent alarm
	A1M	2	Minute of most recent alarm
	A2C	2	Code for last alarm but one
	A2d	2	Date of last alarm but one
	A2b	2	Month of last alarm but one
	A2H	2	Hour of last alarm but one
	A2M	2	Minute of last alarm but one
	A…C		etc., up to 5 alarms

Alarm codes

	Alarm codes	
Alarms	1	Excessively low pressure
	2	Excessively high pressure
	3	Pressure sensor not connected
	4	Pressure sensor short-circuited
	5	Interruption in safety circuit of compressor/fan no. 1
	6	Interruption in safety circuit of compressor/fan no. 2
	7	Interruption in safety circuit of compressor/fan no. 3
	8	Interruption in safety circuit of compressor/fan no. 4
	9	Interruption in safety circuit of compressor/fan no. 5
	10	Interruption in safety circuit of compressor/fan no. 6
	11	Interruption in safety circuit of compressor/fan nos. 7 – 12
	13	Alarm contact C1
	14	Alarm contact C2
	16	Fault on a slave unit

newel 2
Electronic System Developed by DIGITEL

User Manual

REGULATION OF HYGROMETRY

Digitel reserves the right to modify the technical characteristics
described without prior notice.
Non-contractual document

File: f_régulation d'hygrométrie.doc
19/11/2008

Table of Contents

1. *Introduction*

☝ *It is assumed that the reader of this document will previously have read the manual entitled "Introduction". The latter describes all the basic concepts which are essential to an understanding of the present document, and of the concept of the NEWEL2 product range in general.*

This manual describes the operation of modules for the ***regulation of hygrometry****. In this case, parameter* ***[r1] in the basic configuration will be programmed to 2.***

2. *General description. Basic connections*

Connections will be completed in accordance with the circuit layout shown in Figures 1 or 2.

Figure 1: DI24D

1) The contact between 26 and 28 will be interrupted in case of an alarm or interruption in supply

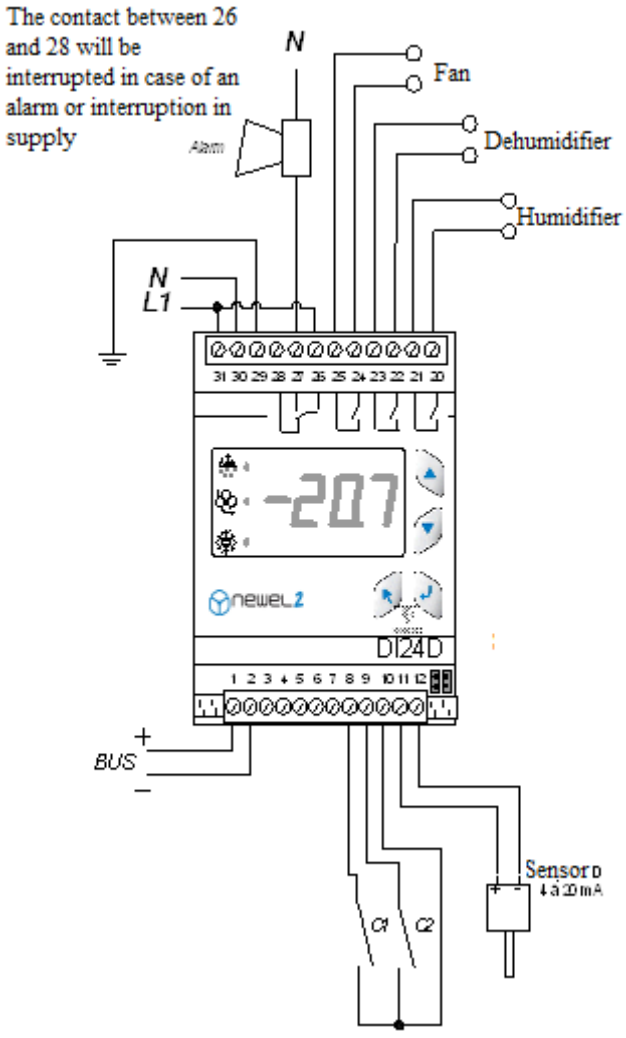
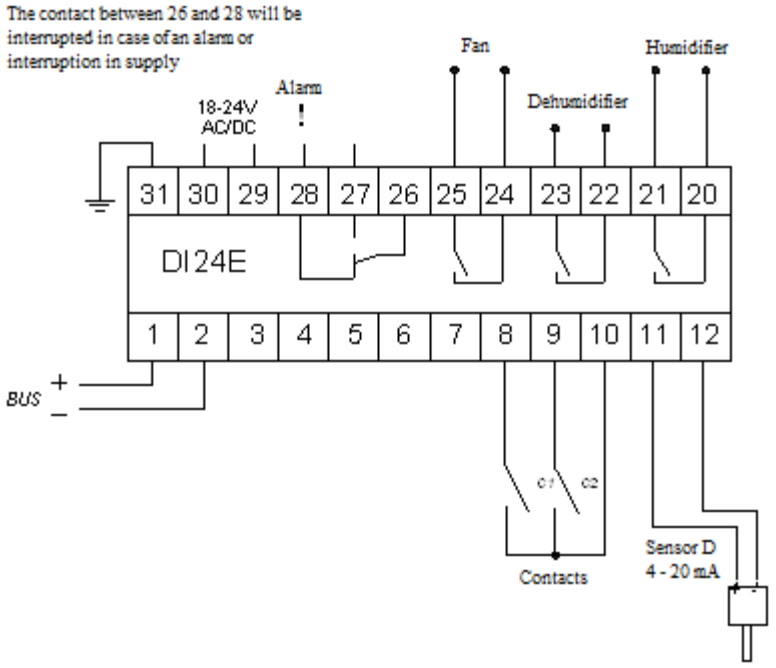
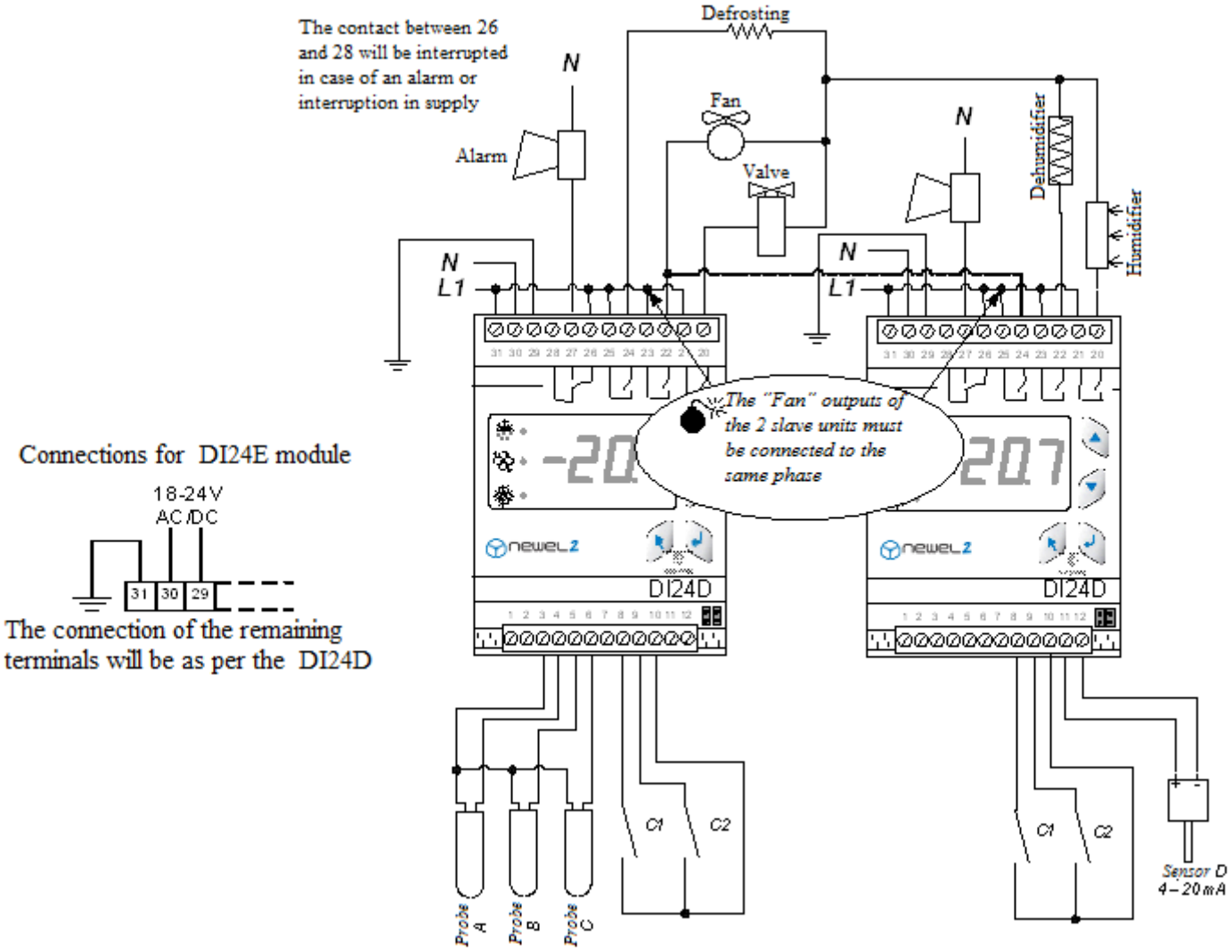


Figure 2: DI24E



*3. **Regulation of hygrometry***

Figure 3



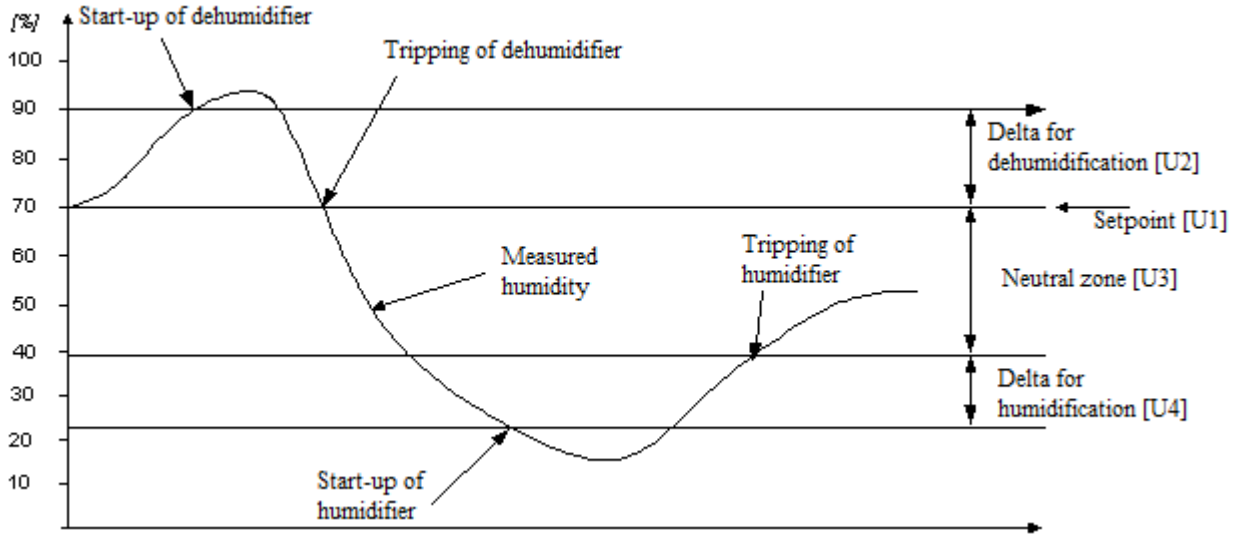
The operation of the hygrometry regulation function will be as follows:

If the measured humidity rises above **[U1] + [U2]**, the dehumidification relay will be activated. This relay will remain active until the humidity falls below **[U1]**.

If the humidity falls below **U1] – [U3] – [U4]**, the humidifier relay will be activated. This relay will remain active until the humidity rises above **[U1] – [U3].**

[U1] Setpoint (*Regulation menu*)
[U2] Delta for dehumidification (*Regulation menu*)
[U3] Neutral zone (*Regulation menu*)
[U4] Delta for humidification (*Regulation menu*)

This function is represented graphically in the diagram below.



The regulation system is provided with a programmable alarm function (parameters **[E1], [E2]** and **[E3]**).

The regulated variable is measured by a sensor with a 4-20 mA output.

The functions of contacts C1 and C2 will be programmable. These may function as alarm contacts, shutdown contacts or setpoint offset contacts (see Chapter 7).

4. Other applications

The module can be easily adapted to other applications, e.g. the regulation of concentrations of oxygen, carbon dioxide, etc.

A sensor with a 4-20 mA output will be required for this purpose, together with the adaptation of parameters **[o1]** and **[o2]**.

[E1] Lower alarm limit (*Security menu*)
[E2] Upper alarm limit (*Security menu*)
[E3] Alarm delay (*Security menu*)
[o1] Range of measurement of sensor – Lower limit (*Setting menu*)
[o2] Range of measurement of sensor – Upper limit (*Setting menu*)

5. Setpoint offset

The setpoint determined by the value of parameter **[U1]** may be temporarily offset by a positive or negative value which is programmable in parameter **[U5]**. This offset will be controlled by the clock function of the module within a given time interval, the start of which will be equal to the value of parameter **[U6]** and the end of which will be equal to the value of **[U7]**.

The same setpoint offset may be controlled by the closure of contacts C1 or C2, where the function of the latter is programmed to 4 (see parameters **[o4]** and **[o6]** in Chapter 7) or by the weekly schedule function (see Chapter 8).

The alarm limits programmed in **[E1]** and **[E2]** will be offset at the same time and by the same value as the setpoints.

6. Analogue output

This output is intended for the control of a FXA01 module, which is provided with a 4-20 mA and 0-10V output – see Figures 4 and 5. This output will vary proportionally to the humidity value, between parameters **[b2]** and **[b3]**.

Figure 4: DI24D

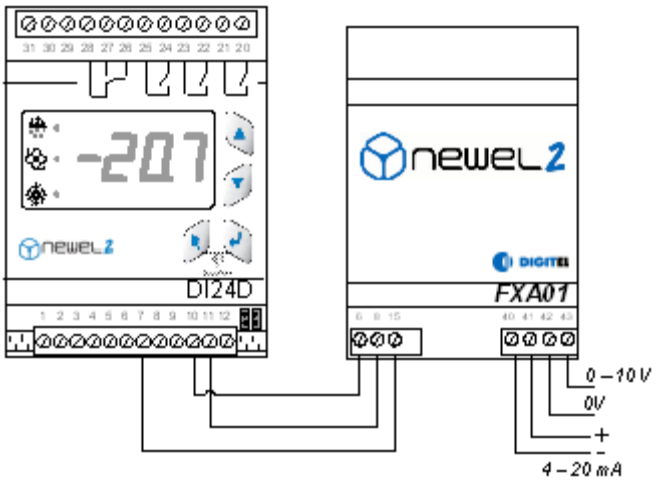
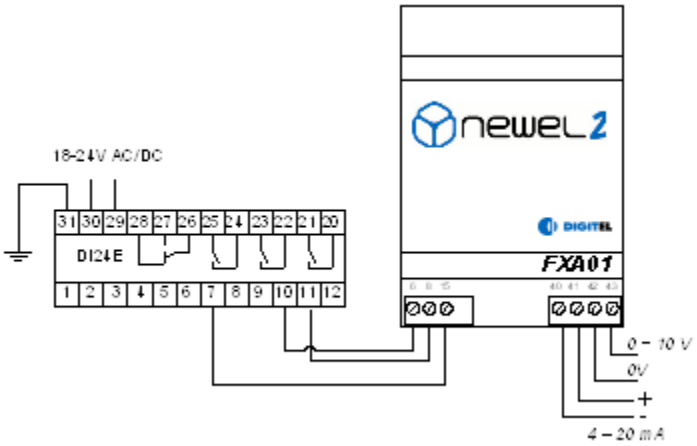
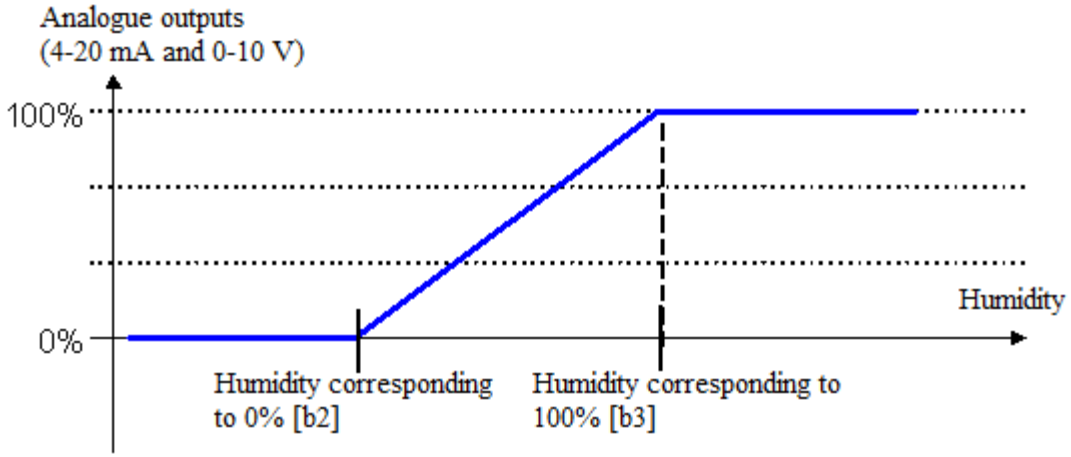


Figure 5: DI24E



[b2] Analogue output – Humidity corresponding to 0% (*Analogue output menu*)
[b3] Analogue output – Humidity corresponding to 100% (*Analogue output menu*)
[E1] Lower alarm limit (*Security menu*)
[E2] Upper alarm limit (*Security menu*)
[o4] Function of contact C1 (*Settings menu*)
[o6] Function of contact C2 (*Settings menu*)
[U1] Setpoint (*Regulation menu*)
[U5] Setpoint offset (*Regulation menu*)
[U6] Start of setpoint offset (*Regulation menu*)
[U7] End of setpoint offset (*Regulation menu*)



7. C1, C2 contacts

The functions of contacts C1 and C2 will be determined by parameters **[o4]** and **[o6]**. These may function as alarm contacts, shutdown contacts or setpoint offset contacts.

8. Weekly schedule

This option will only be available with central unit DI48

This option provides scope for the modification of the operation of the slave unit during periods of reduced activity, in accordance with a weekly schedule which is entered in the central remote monitoring unit (for example, hours of closure of supermarkets). Depending upon the programming of parameters in the "Schedule" menu during periods of closure, the slave unit may shut down the regulation function by tripping all outputs, or initiate a setpoint offset.

Mode of operation of hygrometry

Basic configuration 

	Symbol	*Level*	*Function*	*Comment*	*Default value*	*Value applied*
	NONE	0	Password		0	
	r1	3	Mode of operation *0 = cooling unit 1 = Management of compressors 2 = Universal regulation 3 = Monitoring 4 = Management of evaporators 2, 3, etc.*		2	

Parameters 

	Symbol	*Level*	*Function*	*Comment*	*Default value*	*Value applied*
	NONE	0	Password		0	
Regulation	U1	2	Setpoint (%)		70	
	U2	2	Delta for dehumidification limit (%)		2	
	U3	2	Neutral zone (%)		2	
	U4	2	Delta for humidification (%)		2	
	U5	2	Setpoint offset (%)		0	
	U6	2	Start of setpoint offset (HH.M)		0	
	U7	2	End of setpoint offset (HH.M)		0	
Analogue output	b1	2	Function of analogue output *0 = proportional to the measured humidity*		0	
	b2	2	Analogue output – humidity corresponding to 0% (%)		50	
	b3	2	Analogue output – humidity corresponding to 100% (%)		80	
Safety	E1	2	Lower alarm limit (%)		55	
	E2	2	Upper alarm limit (%)		80	
	E3	2	Alarm delay (min)		30	
Settings	o1	2	Range of measurement of hygrometry sensor – Lower limit (%)		0	
	o2	2	Range of measurement of hygrometry sensor – Upper limit (%)		100	
	o3	2	Correction of sensor (%)		0	
	o4	2	Function of contact C1 *0 = alarm upon closure 3 = display* *1 = alarm upon opening 4 = setpoint offset upon contact closure* *2 = shutdown*		0	
	o5	2	Alarm delay (min)	o4 = 0 or 1	30	
	o6	2	Function of contact C1 *0 = alarm upon closure 3 = display* *1 = alarm upon opening 4 = setpoint offset upon contact closure* *2 = shutdown*		0	
	o7	2	Alarm delay (min)	o6 = 0 or 1	30	
	o8	2	Level 1 password (user)		0	
	o9	2	Level 2 password (operating engineer)		0	
	o10	2	Level 3 password (installer)		0	
Alarms	A1C	2	Code of most recent alarm			
	A1d	2	Date of most recent alarm			
	A1b	2	Month of most recent alarm			
	A1H	2	Hour of most recent alarm			
	A1M	2	Minute of most recent alarm			
	A2C	2	Code for last alarm but one			
	A2d	2	Date of last alarm but one			
	A2b	2	Month of last alarm but one			
	A2H	2	Hour of last alarm but one			
	A2M	2	Minute of last alarm but one			
	A…C		etc., up to 5 alarms			

Alarm codes

	Alarm codes	
Alarms	1	Measured variable too low
	2	Measured variable too high
	3	Hygrometry sensor not connected
	4	Hygrometry sensor short-circuited
	13	Alarm contact C1
	14	Alarm contact C2
	16	Fault on a slave unit

newel 2
Electronic System Developed by DIGITEL

User Manual

« INPUT – OUTPUT » MODE

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File: f_surveillance.doc
17/08/2012

Table of Contents

1. Introduction

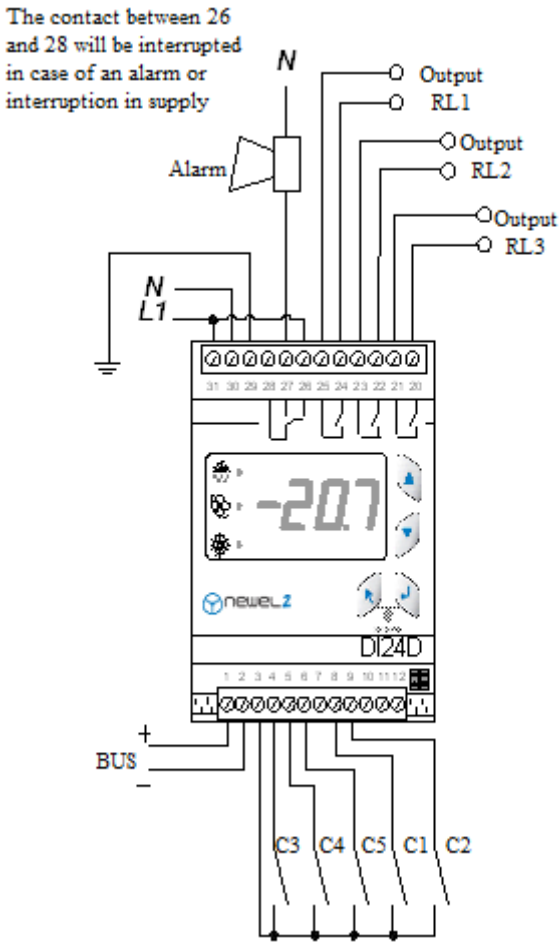
☝ It is assumed that the reader of this document will previously have read the manual entitled "Introduction". The latter describes all the basic concepts which are essential to an understanding of the present document, and of the concept of the NEWEL2 product range in general.

This manual describes the operation of slave units as modules for the ***monitoring of "on-off" outputs. In this case, parameter [r1] in the basic configuration will be programmed to 3.***

2. General description. Basic connections

Basic connection will be completed in accordance with the circuit layout shown in Figures 1 or 2.

Figure 1: DI24D



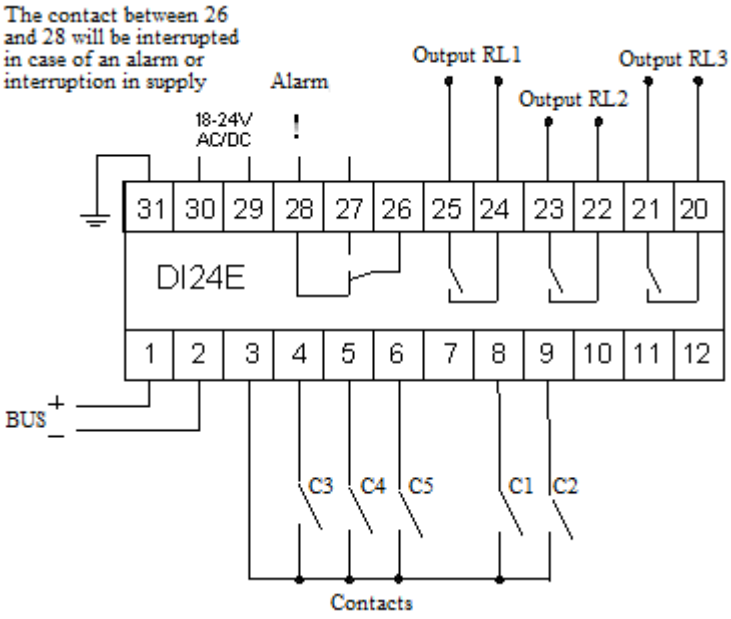


Figure 2: DI24E

In this mode of operation, modules can monitor the status of 5 zero-potential contacts, C1 – C5.

Depending upon the programming of the respective parameters **[C1], [C3], [C5], [C7]** and **[C9**], these contacts will function as alarm contacts upon closure (value 0) or alarm contacts upon opening (value 1). Where the parameter value is set to 2, the corresponding contact will not trigger an alarm. However, the status of the contact concerned may be viewed on the remote monitoring screen. Parameters **[C1]** and **[C3]** may also be programmed to 3. In this case, the closure of the corresponding contact will suspend the monitoring of all other inputs.

Parameters [C1] and [C3] may also be programmed to 4. In this case, the corresponding contact (contact C1 for [C1] and contact C2 for [C3]) will be used for current measurement.

Alarm delays will be introduced in parameters **[C2], [C4], [C6], [C8]** and **[C10]**.

The status of the output contacts RL1, RL2 and RL3 will depend upon the values of parameters **[L1], [L2]** and **[L3]** respectively. Where the programmed value is equal to zero, the corresponding contact will be open (relay released) and where this value is equal to 1, the contact will be closed (relay blocked). This provides the option for the remote modification of the operation of the installation, by the switching of various contacts from the remote monitoring computer. Likewise, certain faults can be reset remotely by means of an electric pulse.

Modules programmed for this mode of operation, in association with pressure regulation modules, can be used for the monitoring of the safety circuits of compressors. In a configuration of this type, by the use of remote monitoring, it will be possible to remotely identify the contact responsible for the interruption of the safety circuit of a given compressor.

Figure 3 shows an example of this application.

[C1] Function of contact C1 (*Settings menu*)
[C2] Alarm delay on contact C1 (*Settings menu*)
[C3] Function of contact C2 (*Settings menu*)
[C4] Alarm delay on contact C2 (*Settings menu*)
[C5] Function of contact C3 (*Settings menu*)
[C6] Alarm delay on contact C3 (*Settings menu*)
[C7] Function of contact C4 (*Settings menu*)
[C8] Alarm delay on contact C4 (*Settings menu*)
[C9] Function of contact C5 (*Settings menu*)
[C10] Alarm delay on contact C5 (*Settings menu*)
[L1] Command for relay RL1 (*Outputs menu*)
[L2] Command for relay RL2 (*Outputs menu*)
[L3] Command for relay RL3 (*Outputs menu*)

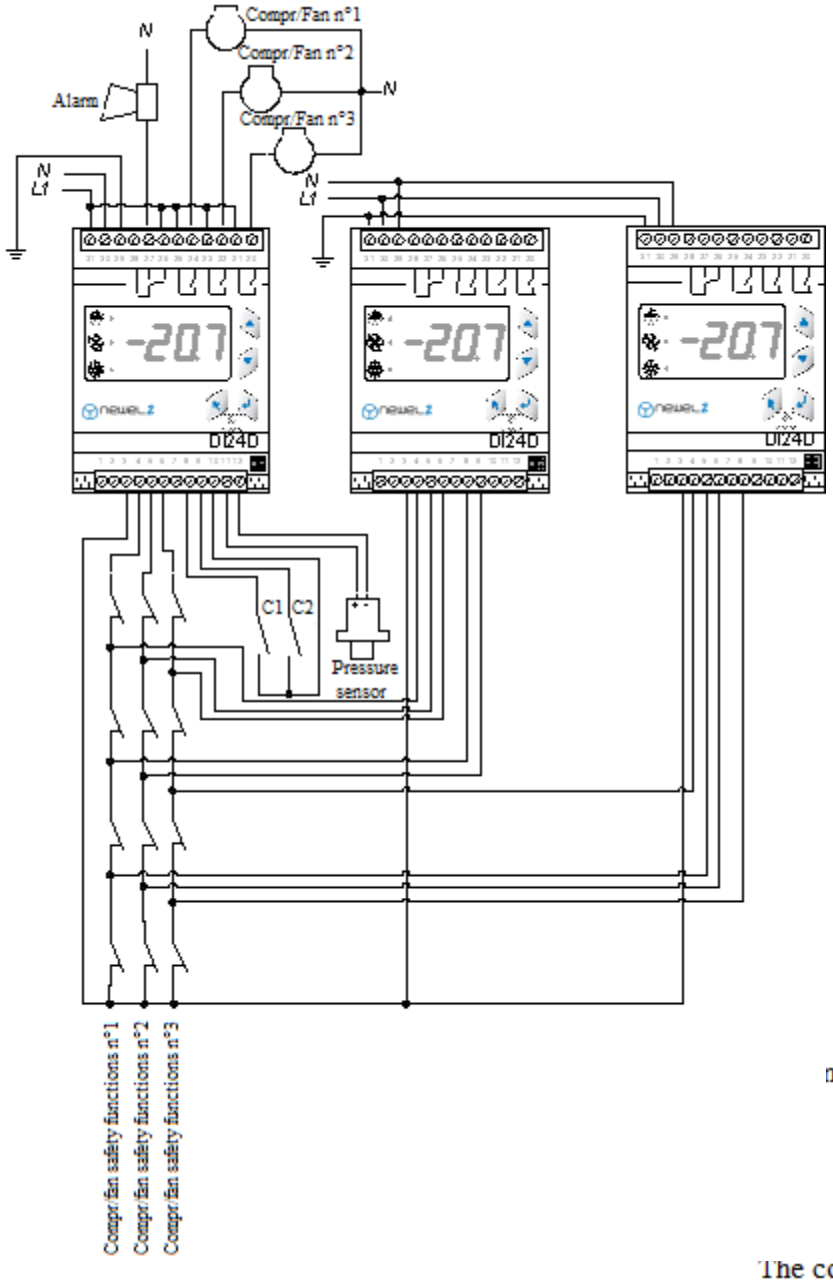
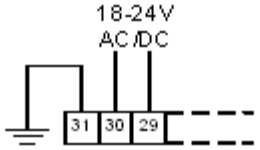


Figure 3

nections for DI24E module

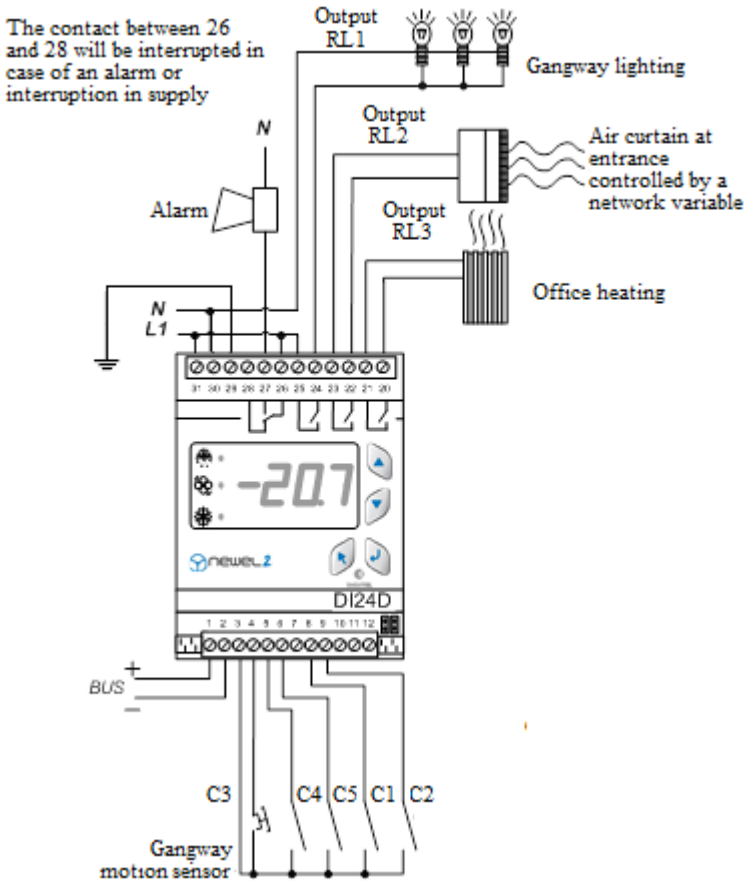


The connection of the remaining terminals will be as per the DI24D

The outputs RL1, RL2 and RL3 may be controlled by the input contacts C3, C4 and C5 respectively. The parameter for “Unit parameters/Settings/Function of contact C1, 2, 3” should be programmed to “Time delay command on RL1, 2, 3”. The trip delay on the output should then be programmed to the parameter “Trip delay on output RL1, 2, 3”. When the contact C1-3 closes, the output RL1-3 will close. After the reopening of the input contact, the output RL1, 2, 3 will reopen after the time delay programmed in the parameter “Trip delay on output RL1, 2, 3”.

Outputs may also be controlled by timers, network variables, combined alarms, etc. Accordingly, a wide variety of functionalities can be programmed. These last functions will only be available where a “ DI58” central unit is installed, and their parameters must be programmed using TelesWin software (these functions are not accessible using the programming buttons).

Two examples are set out below:

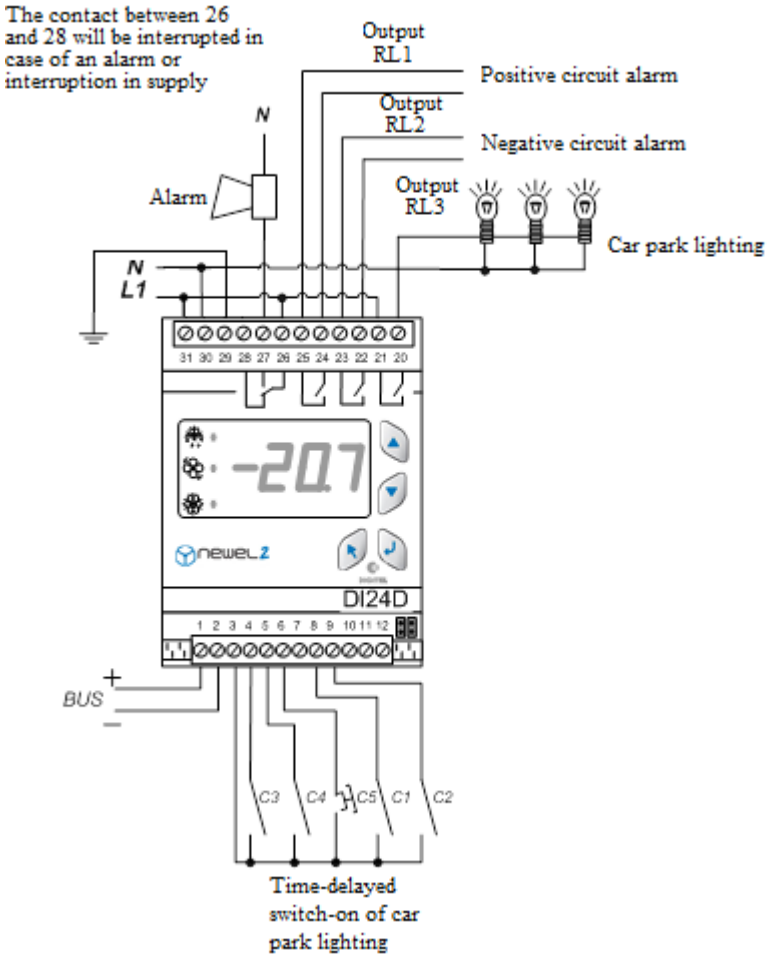


In this example, the output RL1 controls the lighting of a gangway in response to the status of a motion sensor, which is connected to the input contact C3. Accordingly, when the motion sensor generates a signal, the light will be illuminated for the length of time programmed in the parameter “Trip delay on output RL1”.

Output RL2 will be controlled by a network variable described as “Exterior temperature”. For more information on network variables, the reader is referred to the documentation “TelesWin and DI58, 13.10”.

Output RL3 will be controlled by a timer. The heating system, which is provided with its own thermostat, will operate during the times programmed in the timer, and will be disconnected outside the times programmed in the timer.

1) The contact between 26 and 28 will be interrupted in case of an alarm or interruption in supply



In this circuit arrangement, outputs RL1 and RL2 will serve as combined alarm outputs. All alarms on the constituent units of the positive circuit will be signaled by output RL1. All alarms on the constituent units of the negative circuit will be signaled by output RL2. For more information on combined alarms, the reader is referred to the documentation “TelesWin and DI58, Chapter 13.11”.

Output RL3 will control the lighting of a car park. During opening hours, which are programmed using a timer, lighting will be in service at all times. During hours of closure, lighting will only be illuminated when the switch connected to C5 is pressed. Accordingly, lighting will be in service for the duration programmed using the parameter “Trip delay on output RL3”.

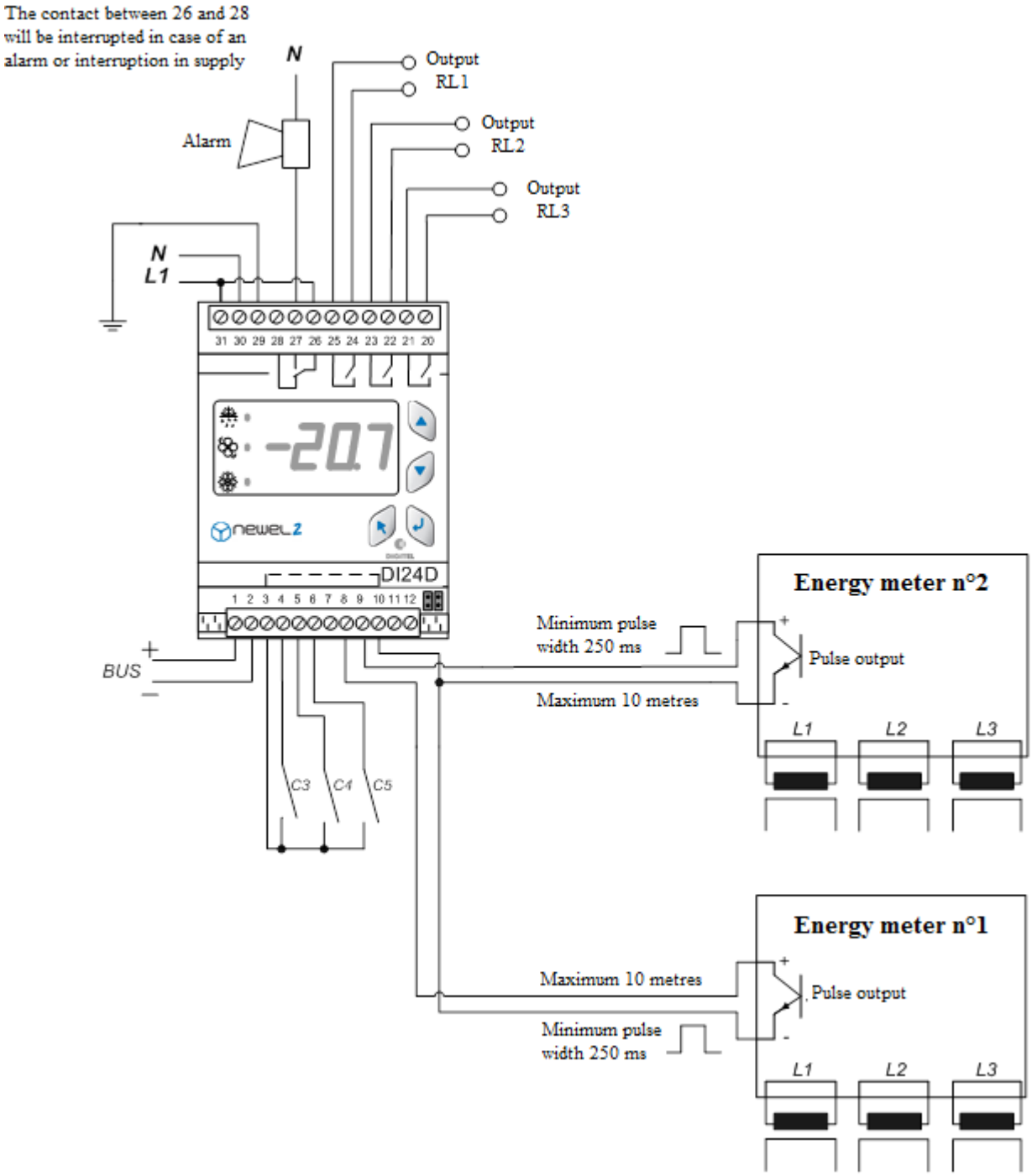
These are only examples – a wide variety of functions can be delivered using the input-output mode.

3. Weekly schedule

This option will only be available with central unit DI58

This option provides scope for the modification of the operation of the slave unit during periods of reduced activity, in accordance with a weekly schedule which is entered in the DI58 central remote monitoring unit (for example, hours of closure of supermarkets). Depending upon the programming of parameters in the “Schedule” menu during periods of closure, the slave unit may shut down the function for the monitoring of inputs during periods of closure.

4. Energy metering



Input-Output mode

Basic configuration 

Symbol	Level	Function	Comment	Default value	Value applied
NONE	0	Password		0	
r1	3	Mode of operation *0 = Cooling unit 1 = Management of compressors 2 = Universal regulation 3 = Monitoring 4 = Management of evaporators 2, 3, etc.*		3	

Parameters 

	Symbol	Level	Function	Comment	Default value	Value applied
	NONE	0	Password		0	
Settings	C1	2	Function of contact C1 *0 = alarm upon closure 1 = alarm upon opening* *2 = suspension of monitoring of all contacts upon closure of C1* *3 = display 4 = energy meter 5 = reserved*		0	
	C2	2	Alarm delay for C1 [min] Number of pulses per kWh	C1 = 0 or 1 C1 = 4	30.0 1.0	
	C3	2	Function of contact C2 *0 = alarm upon closure 1 = alarm upon opening* *2 = suspension of monitoring of all contacts upon closure of C5* *3 = display 4 = energy meter 5 = reserved*		0	
	C4	2	Alarm delay for C2 [min] Number of pulses per kWh	C2 = 0 or 1 C2 = 4	30.0 1.0	
	C5	2	Function of contact C3 *0 = alarm upon closure 1 = alarm upon opening 3 = display 2, 4, & 5 = reserved*		0	
	C6	2	Alarm delay for C3 [min]	C5 = 0 or 1	30.0	
	C7	2	Function of contact C4 *0 = alarm upon closure 1 = alarm upon opening 3 = display 2, 4, & 5 = reserved*		0	
	C8	2	Alarm delay for C4 [min]	C7 = 0 or 1	30.0	
	C9	2	Function of contact C5 *0 = alarm upon closure 1 = alarm upon opening 3 = display 2, 4, & 5 = reserved*		0	
	C10	2	Alarm delay for C5 [min]	C9 = 0 or 1	30.0	

Outputs	L1	2	Command of relay RL1 *0 = open, 1 = closed*		0	
	L2	2	Command of relay RL2 *0 = open, 1 = closed*		0	
	L3	2	Command of relay RL3 *0 = open, 1 = closed*		0	

Gen.	o8	2	Level 1 password (user)		0	
	o9	2	Level 2 password (operating engineer)		0	
	o10	2	Level 3 password (administrator)		0	

Alarms	A1C	2	Code of most recent alarm
	A1d	2	Date of most recent alarm
	A1b	2	Month of most recent alarm
	A1H	2	Hour of most recent alarm
	A1M	2	Minute of most recent alarm
	A2C	2	Code for last alarm but one
	A2d	2	Date of last alarm but one
	A2b	2	Month of last alarm but one
	A2H	2	Hour of last alarm but one
	A2M	2	Minute of last alarm but one
	A…C		etc., up to 5 alarms

Alarm codes

	Alarm codes	
Alarms	5	Alarm on contact C3
	6	Alarm on contact C4
	7	Alarm on contact C5
	13	Alarm on contact C1
	14	Alarm on contact C2
	16	Fault on a slave unit

newel 2
Electronic System Developed by DIGITEL

User manual

REMOTE MONITORING & REMOTE MANAGEMENT

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Table of contents

1. Introduction

In fundamental terms, the "TelesWin" system has been designed for the remote monitoring and remote management of refrigeration and air-conditioning installations. Further improvements have made this system suitable for application in other fields, including the monitoring and management of buildings, residences, etc.

At present, we can offer a wide range of devices which are directly compatible with this system. Specifically, these include modules for the management of cooling units, central units for compressors, condensers and hygrometry, and units for the management of the heating, ventilation and lighting of buildings (NEWEL and NEWEL2).

The object of this document is to initiate the user in the fundamental operations of the "TelesWin" system, together with the functions of the DI58 central unit. Functions which are specific to the previous range of central units are identified by the abbreviation **AUC,** which means "previous central unit" ["ancienne unite centrale"].

TelesWin software runs on Windows. The present document assumes that the reader has a good knowledge of this operating system and, accordingly, operations which are considered as standard are not described.

It is assumed that the reader is equipped with a complete system, and will undertake the exercises suggested on their own computer.

IMPORTANT: The attached license agreement for TelesWin software should be read carefully before any use of software or the present documentation. If you do not agree to the terms of this license, you will be required to return the complete software to your dealer within 24 hours.

Please complete the registration form and return by mail or fax to the following address:

Digitel SA
Route de Montheron 12
CH-1053 Cugy
Fax : ++41 21 731 07 61

We cannot provide any technical assistance to clients who do not return this form. Likewise, any such clients will not be entitled to acquire future updates.

2. Hardware required

In the monitoring terminal (e.g. in a refrigeration engineer's office), the "TelesWin" system will require the following hardware:

2.1 Windows-compatible computer

	MINIMUM	RECOMMENDED
Operating system (32 or 64 bit)	Windows 95, 98, NT – single-terminal operation,	
2000, XP, Vista and 7		
Hard drive capacity	100 MB	500 MB
CD reader	8x	16x
RAM	256 MB	
Keyboard & mouse	YES	
Serial port	YES for connection via a modem	
USB port	YES for DONGLE connection	
LAN port	YES for direct connection or connection via the Internet	
VGA colour monitor	YES	
Monitor resolution	800x600	1024x768

Figure 2.1.1

* *The program will run in 256 colour mode, but colours will be changed*

2.2 Important comments

- ✓ The Windows operating system must be configured for the maximum number of colours available on the PC used.
- ✓ The date and time on the PC clock must be set correctly.
- ✓ Files and directories used by TelesWin must not be modified, moved or deleted, whether manually or by the use of other programs. By default, these files will be stored in the directory c:\TelesWin.
- ✓ It is recommended that records, alarm messages etc. which are no longer relevant should be deleted. Large files will slow down the running of the program.
- ✓ For the restarting of TelesWin following an interruption in the power supply, it is preferable that TelesWin should be installed and started up in a session without the use of a password, by deactivating the function "request Ctrl+Alt+Del upon start-up of PC" in the "configuration panel\user accounts\management of user accounts\advanced options", unchecking "users must press Ctrl+Alt+Del to open a session".
- ✓ For the automatic start-up of TelesWin upon restarting, simply apply the following procedure:
  - Click on the Windows start button
  - Go to the list of programs
  - Double click on start-up
  - A window will open – simply enter a TelesWin shortcut using cut and paste or drag and drop.

2.3 External modem

- ✓ Hayes compatible
- ✓ Minimum speed 56,600 bauds

3. Connection with DI58

3.1 Connection with DI58

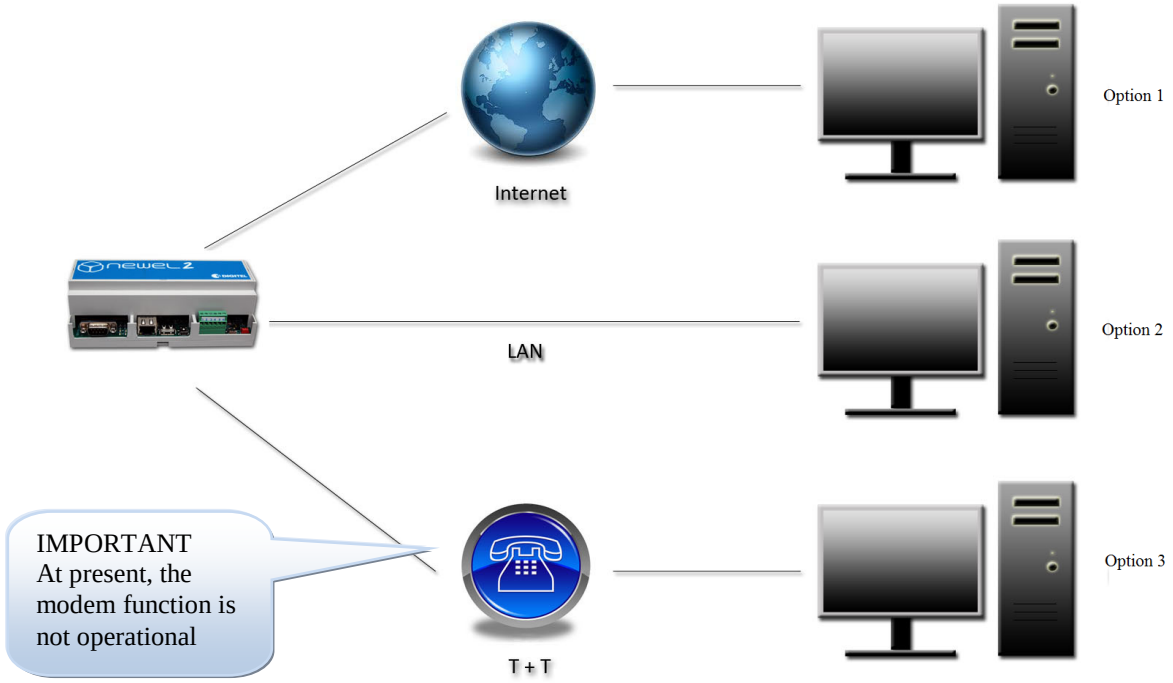


Figure 3.1.1

The fastest and most reliable connection will be a direct LAN or Internet connection. This will permit communication at very high speeds, with the substantial saving of time. For this reason, we strongly recommend this type of connection.

It is possible to connect the modem to the computer using a RS232 cable on the serial port, for communications via a telephone line. However, this form of communication will be significantly slower.

Option 3 will be valid for modems supplied by our company.

Other types of modem may be used, e.g. internal modems. In this case, however, issues involving the compatibility of protocols and conflicts with other modules on the computer may arise and, in many cases, the intervention of specialized personnel will be required for the resolution of these issues.

We cannot guarantee the correct operation of the remote monitoring function or the compatibility of future versions of programs with modems which are not supplied by Digitel.

4. Installation of the "TelesWin" program

It is strongly advised that all other programs running on the PC should be closed before starting the installation process. This will apply specifically to resident programs, such as anti-virus software, the screen saver, etc. These programs may interfere with the correct installation of TelesWin software. The anti-virus test on the installation medium may be completed before installation.

To install the software, insert the CD into the reader and start the program "setupTelesWin" which is contained on this disk. Follow the customary installation procedure for Windows programs.
The installation program will create the directory "TelesWin" and will copy all the necessary files into this directory.

If, in the course of installation, the installation program asks the question "replace existing files?", click on the button "yes, replace all".

In certain configurations, you may encounter difficulties during the installation of the program. The installation program may display error messages. If this type of problem arises, you should proceed as follows:

1. Close all programs running on the PC. Disable the start-up of all resident programs (e.g. anti-virus software, screen saver, etc.). Restart the PC. Check that the programs disabled previously have not restarted. Restart installation.
2. If problems persist, check that there is at least 100 MB of free capacity on your hard drive. Run the program "*Scandisk*" for the target disk, and restart installation.

5. Updating of previous versions of the program

It is recommended that a back-up copy of the TelesWin working directory (by default c:\TelesWin) should be created before executing any update. If this is not done, data may be lost if an interruption in the power supply or a system failure occurs during this operation. This back-up copy will also allow the user to revert to the previous version, should the new version prove to be incompatible with your system.
To execute an update, follow the same procedure described for the initial installation of software.

6. Starting the program

6.1 Starting the program

To ensure the normal operation of the software, the DONGLE-type electronic key must be connected to a USB port.

Any attempt to read or use this key, other than for its normal use with the TelesWin system, may result in the destruction of the key. This type of destruction is not covered by the terms of the guarantee.

In accordance with standard procedure for Windows, the program is started by double-clicking on the TelesWin icon in the directory of the same name, or by selecting the program in the "Start"menu.

Upon initial start-up, or following a change of configuration (change of communication port, transition from modem connection to direct connection with the DI58, etc.), the software configuration window will open automatically when the program starts up.

Upon initial start-up, the program will run in German. To change to another language, select English from the ["Sprache"] menu and click on "OK" to validate your selection.

Figure 6.1.1

The window which opens will allow the programming of the basic software configuration.

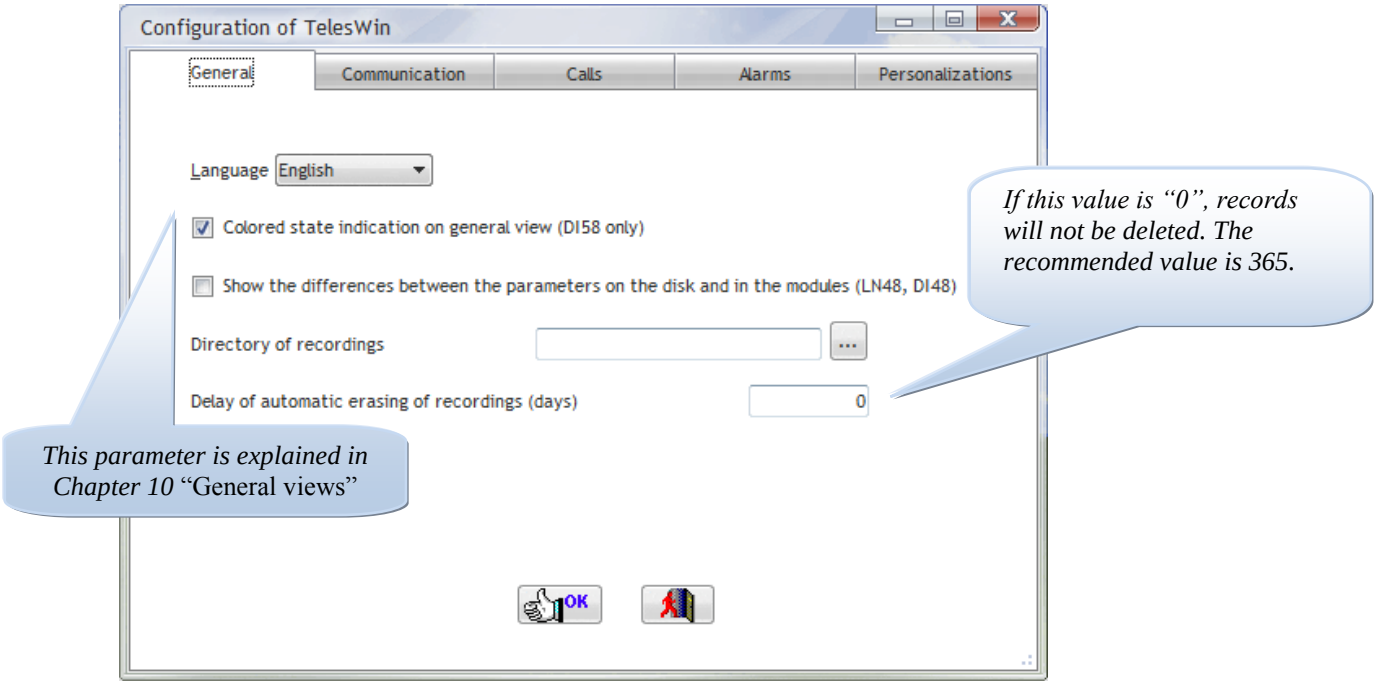


Figure 6.1.2

The “Communication” tab will open window 3.

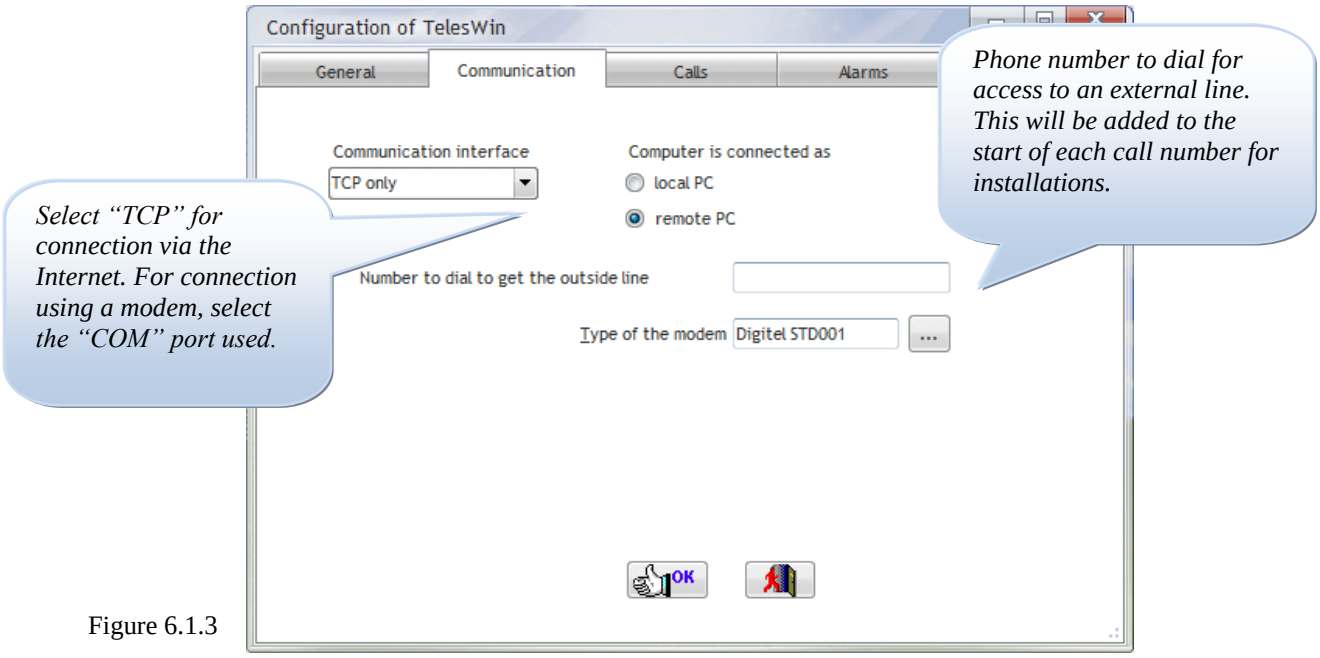


Figure 6.1.3

TelesWin will automatically interrupt communication with the installation concerned if no operation has been executed within a programmable time interval. There may be differentiation in this time interval, according to the time of day. During office opening hours, this time interval will generally be programmed for a longer duration, in order to allow the operator sufficient time to observe and acknowledge anomalies, modify parameters, etc.. Outside operating hours, when the operator is not present, there is no purpose in maintaining communication beyond the time required for the logging of data on the status of the installation and alarms.

Parameters in the “Calls” tab will be used for the programming of the time schedule and times for the interruption of communication, during daytime and nighttime operation.

Important: If a single PC is monitoring a number of installations simultaneously, it is recommended that the automatic communication interruption time should be set as short as possible, in order to allow the proper indication of alarms on all the installations concerned.

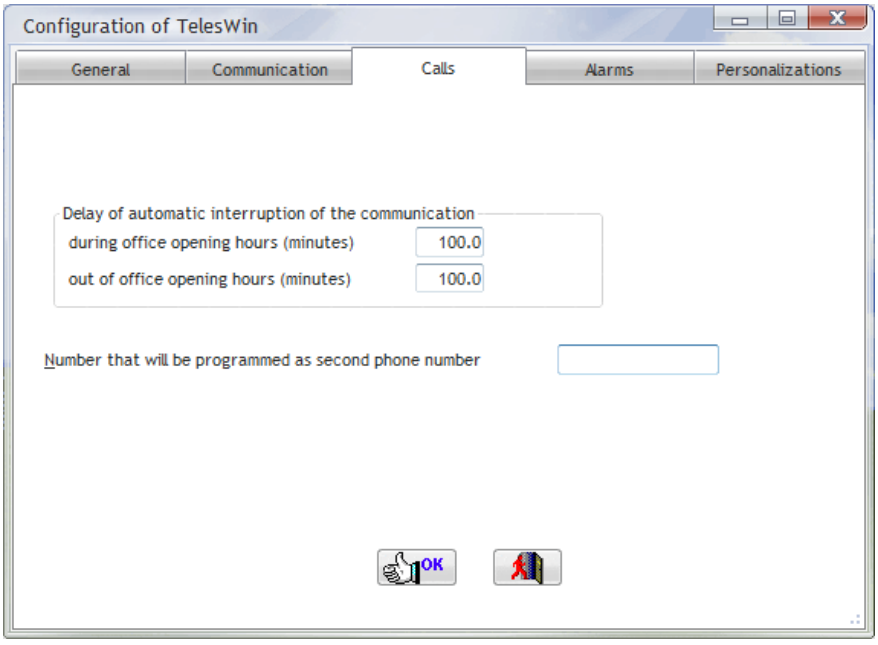


Figure 6.1.4

"Alarms" tab

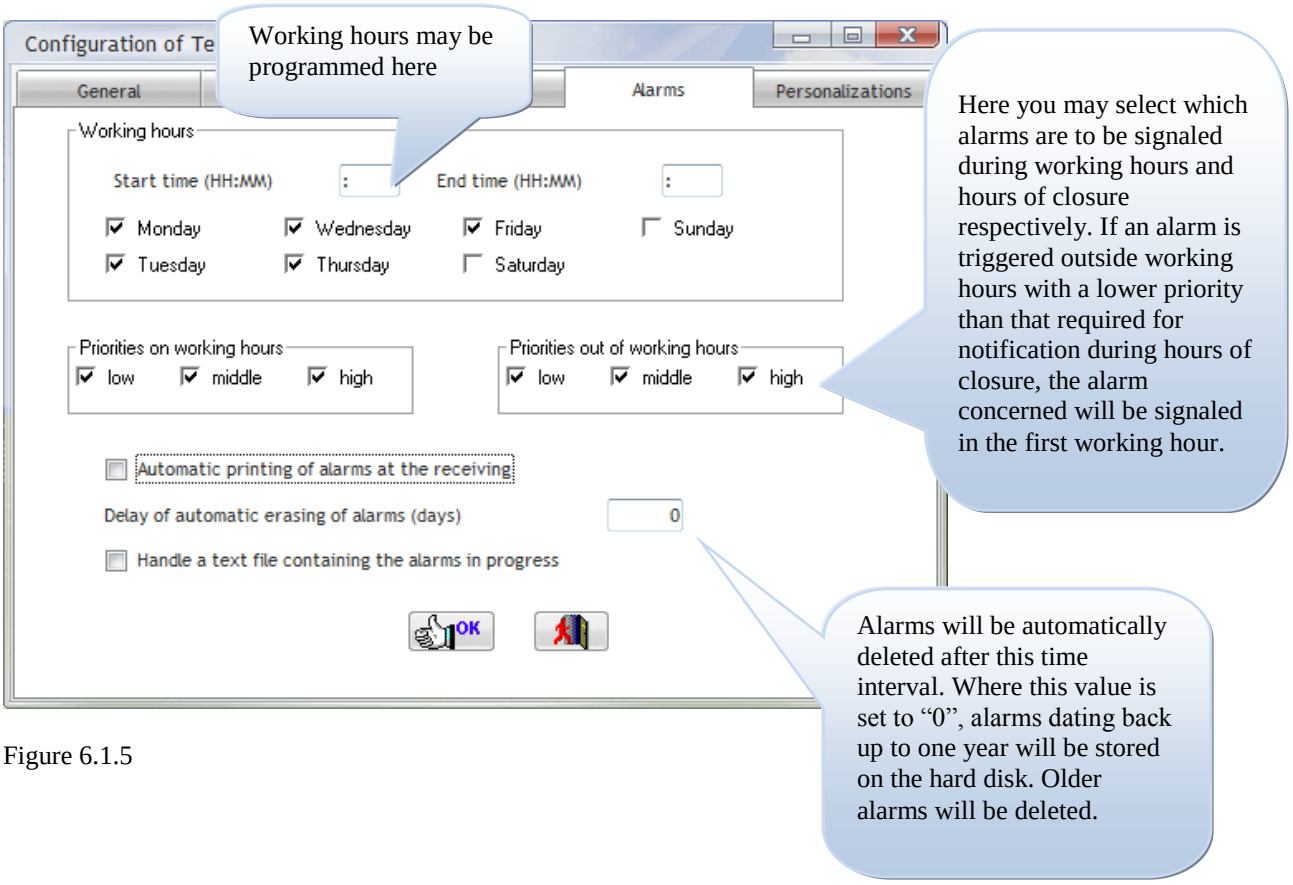


Figure 6.1.5

The "Customization" tab provides the option for the addition of client logos or other images to the saver screen and printed reports. Images must be stored on the hard drive in one of the formats which can be accommodated by TelesWin (RLE, BMP, PCX, GIF, TIFF, JPEG, WMF, ICO, ICW).

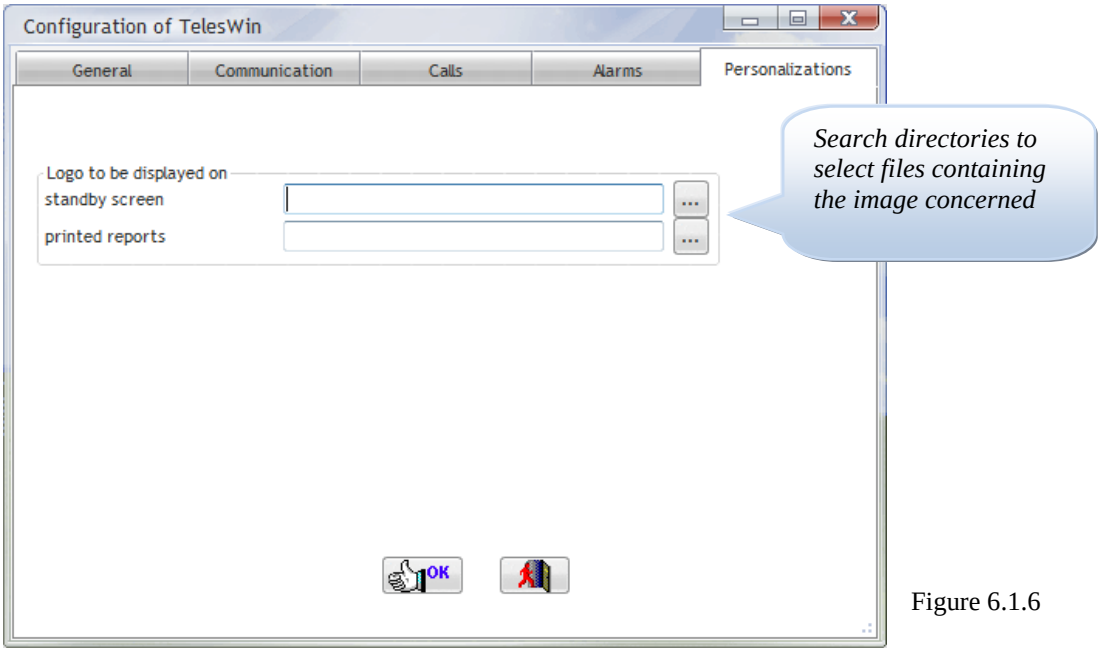


Figure 6.1.6

In normal operation, the PC screen will appear as follows:

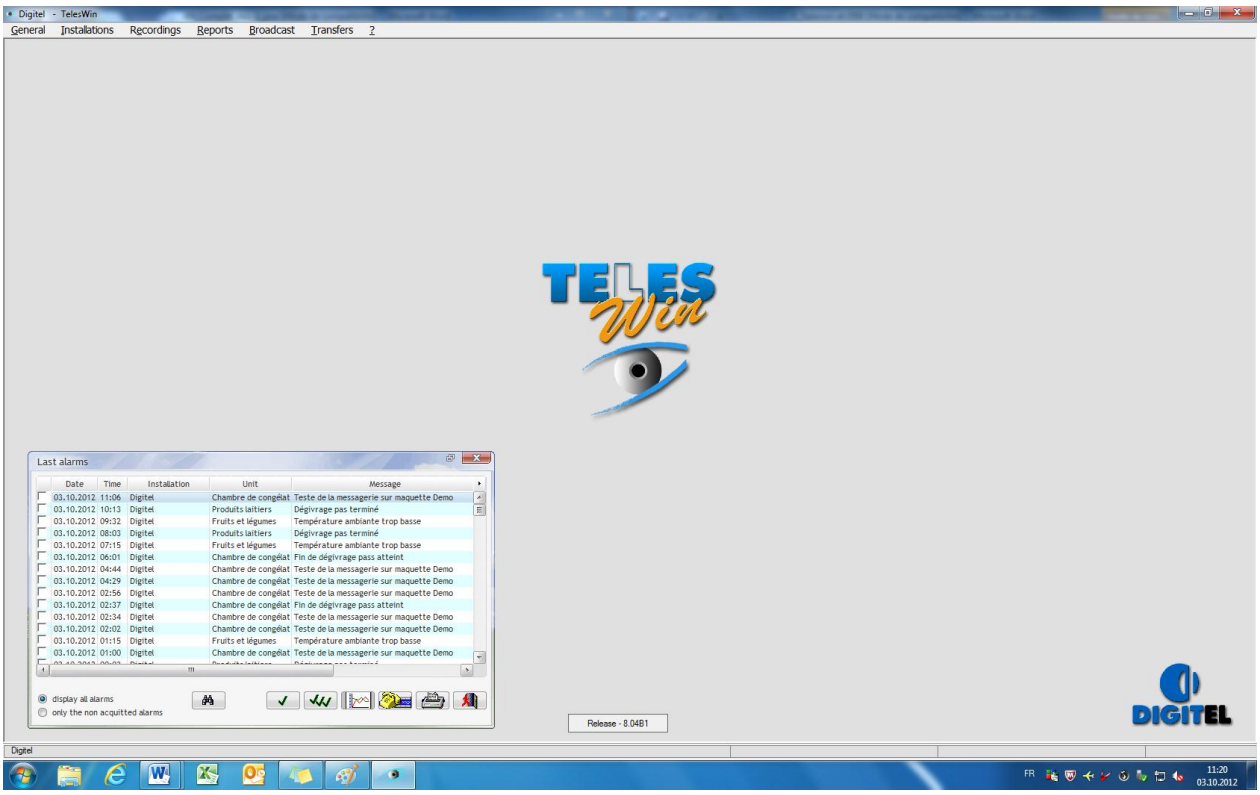


Figure 6.1.7

In this condition, the computer is ready to receive incoming calls from installations.

7. Commissioning of a new installation via a LAN port

7.1 Commissioning of a new installation via a LAN port

Firstly, it will be necessary to connect the DI58 to the PC using a "RJ45" crossover Ethernet cable. To complete a connection, the LAN parameters of the PC must be configured within the same network domain.

In a new DI58, the factory-set LAN parameters will be as follows:

IP address: 192.168.254.254
Netmask: 255.255.255.0
Gateway: 192.168.254.255

If the PC is to be included in the same network domain, the first three digits of the IP address must be the same. To access the network parameters, go to network connection properties. Then go to Internet protocol properties (TCP/IP). The window shown below (Figure 7.2.1) should then open. Before making any changes, record the initial parameters – these will need to be restored later. Complete the following fields as shown in the example (the value "83" has been selected at random – you may enter a value other than 254).

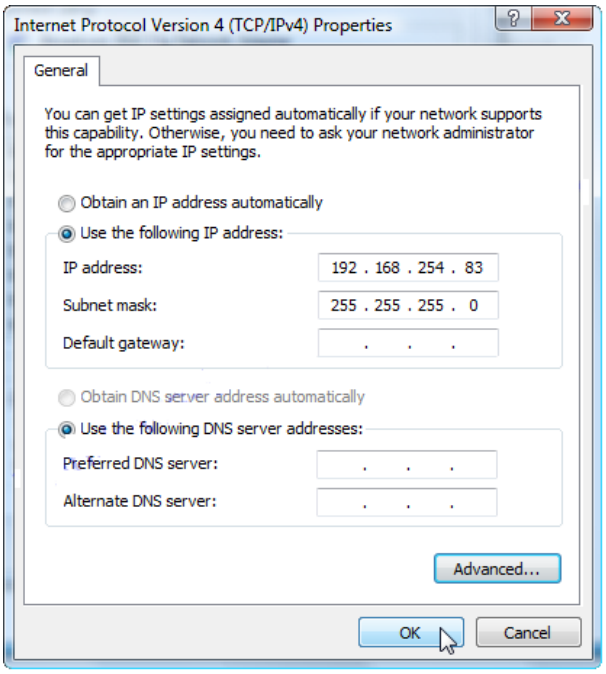


Figure 7.1.1

7.2 Configuration of router

In order to ensure permanent access to your central unit, it will be necessary to configure the redirection of your router ports as shown below:

Protocol	**Ports**	**Address**	**Ports**
TCP	2000 ÷ 2003	to 192.168.254.254	2000 ÷ 2003
FTP	21	to 192.168.254.254	21
Telnet	23	to 192.168.254.254	23

The address indicated has been selected at random. Obviously, the relevant reference will be the address assigned to your DI58 by your network administrator.

Once the changes have been made, click on “OK” to confirm. Connect the DI58 to supply and wait 2 minutes for the completion of initialization. Start the TelesWin program, open the “Communication” tab, select the “TCP” communication port and click on “OK” to confirm.

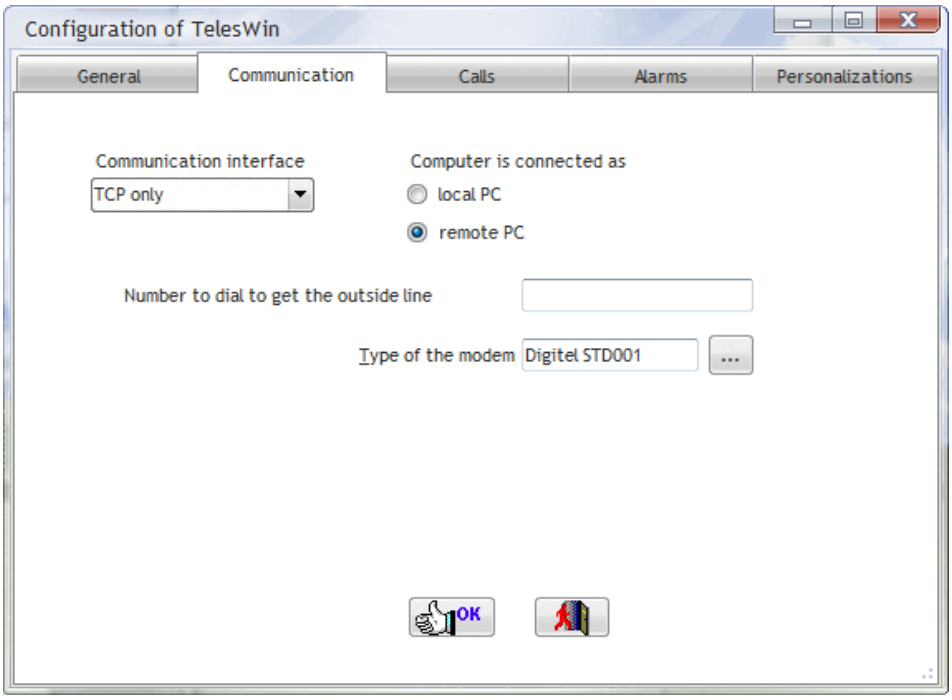


Figure 7.2.1

To call up the DI58, go to “Installations”/ “Call up an installation”.

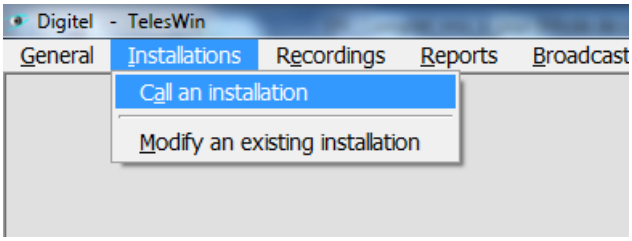


Figure 7.2.2

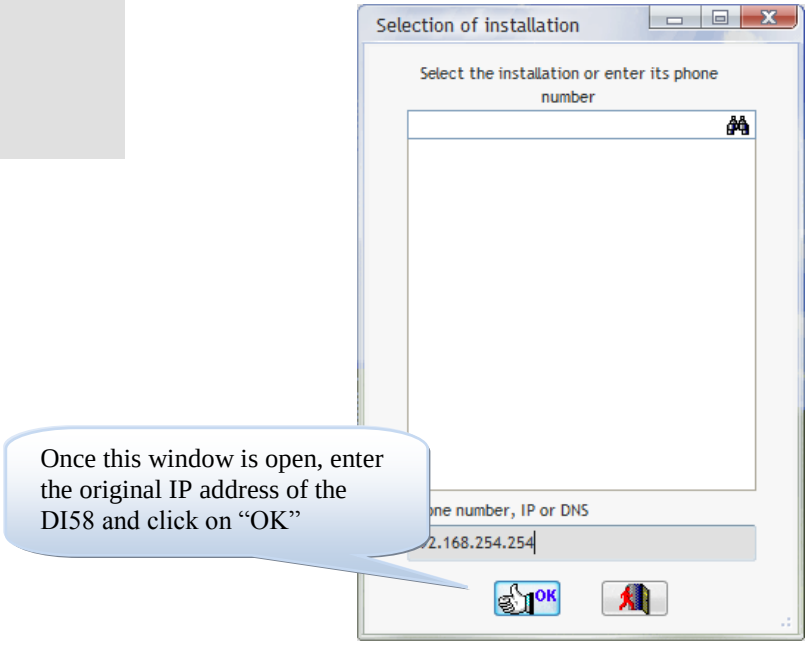
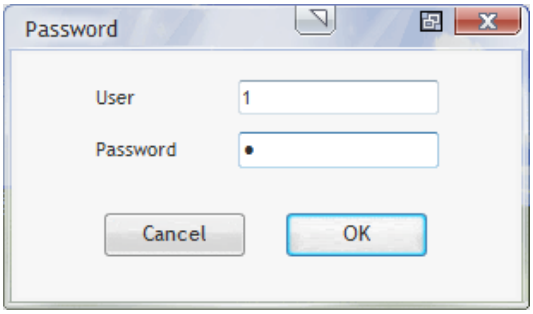


Figure 7.2.3



Complete the identification fields as follows;

User : 1
Password : 1

Then click on “OK”

Figure 7.2.4

The next window will ask you to name your installation. For the purposes of this example, the installation is to be called “Test_Digitel”. Once you have entered a name, confirm your choice. After confirmation, it will be necessary to wait a few minutes for the central unit to become operational.

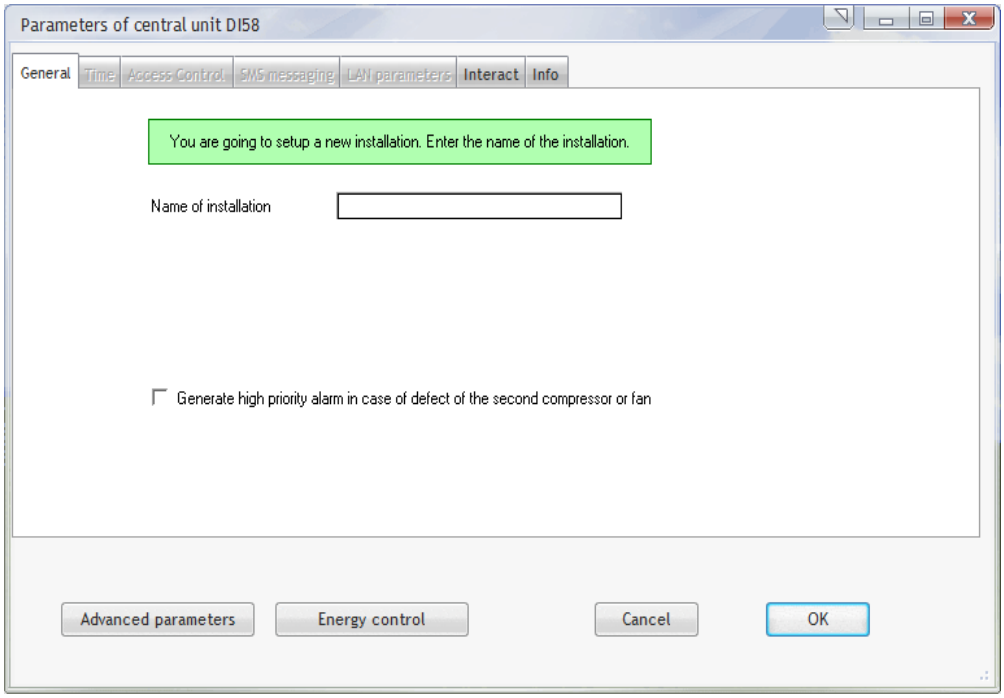


Figure 7.2.5

When you first connect, it is possible that the installation will not display the central unit. To make the latter appear, exit and reconnect or right click in the centre of the window to go to “Configuration, Refresh Configuration”.

This will open the following window:

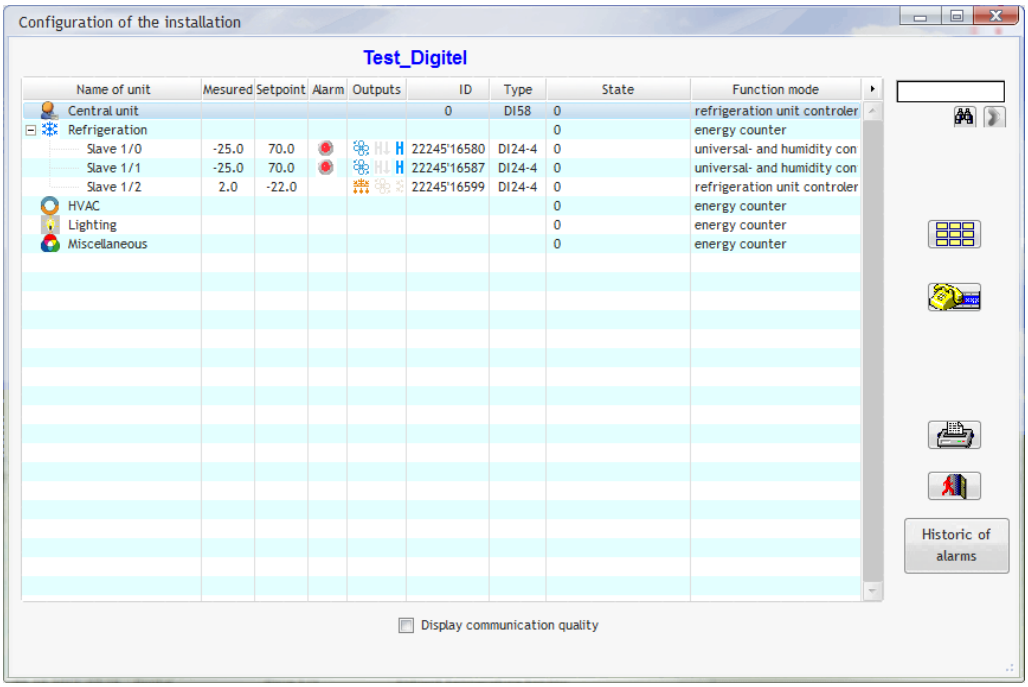


Figure 7.2.6

The next stage will involve the modification of network parameters for the DI58, in order to ensure compatibility with the network domain of your installation. To do this, double click on the central unit. In the resulting window, go to the “LAN parameters” tab.

To complete these fields, you will need to consult your network administrator, who will notify you of the exact addresses which will be accommodated by your network. You will need to note the addresses entered in order to be able to call up the DI58.

At the same time, set the clock using the “Clock” tab, to ensure that everything will function correctly.

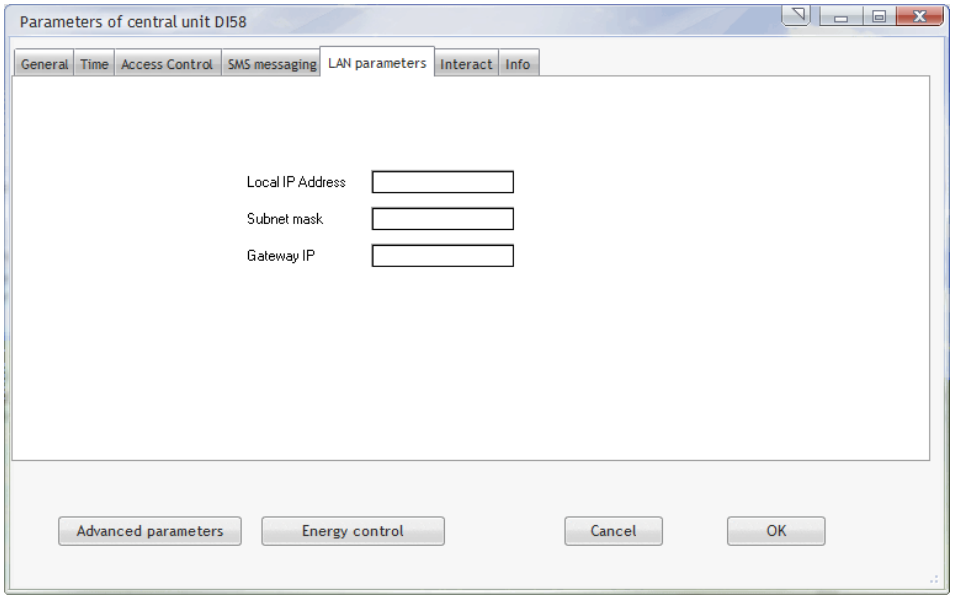
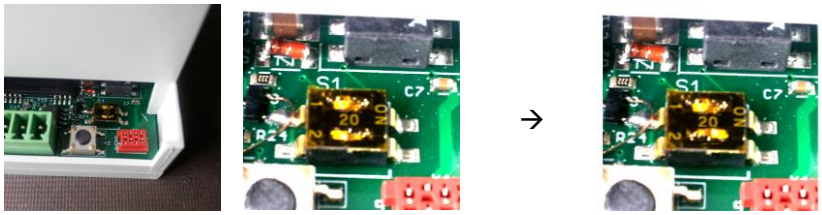


Figure 7.2.7

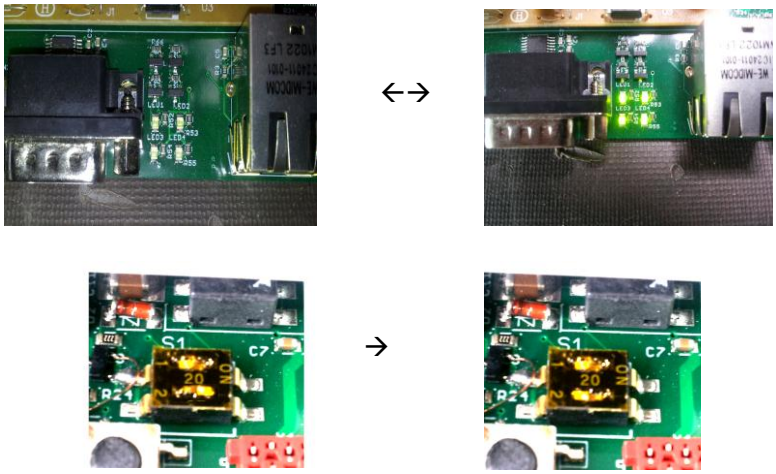
If you lose the addresses entered for the DI58, access to the latter will no longer be possible. However, there is a back-up solution. The factory-set LAN parameters of the DI58 can be reprogrammed manually by the application of the following steps:

- Move switch 2 to the right



- Reset the DI58 (by the brief application of light pressure to the black button on the grey base).

- Wait for 1 – 2 minutes and, once the DI58 has restarted, the four LEDs will flash simultaneously. You will then have 4 seconds to move switch 2 back to the left.



- Once the 4 LEDs are flashing in a continuous sequence, just complete a final reset operation and the factory-set parameters on your DI58 will be restored. You can then return to the start of Chapter 7.

- If you cannot manage to complete the switchover within 4 seconds, the previous parameters will be retained. Complete a reset to retry the operation.

Once the addresses of the DI58 have been modified, you will need to reconfirm the IP parameters of the PC. Simply open the TCP/IP Internet protocol properties and reconfirm the parameters entered prior to the modification.

Connect the DI58 to the network of your installation.
Your central unit is now ready for use. You can now call up your installation.

8. <u>Connection with an installation</u>

8.1 Connection with an installation

To call up an installation, click on the “Installations” tab, then on “Call up an installation”.

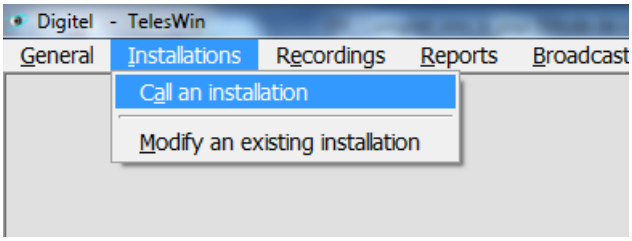
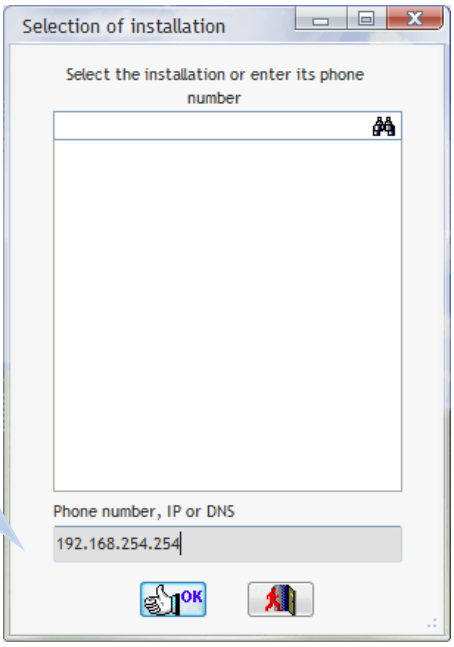


Figure 8.1.1



Enter the IP address of the DI58 which you wish to call up, then click on “OK” (this address has been selected at random)

Figure 8.1.2

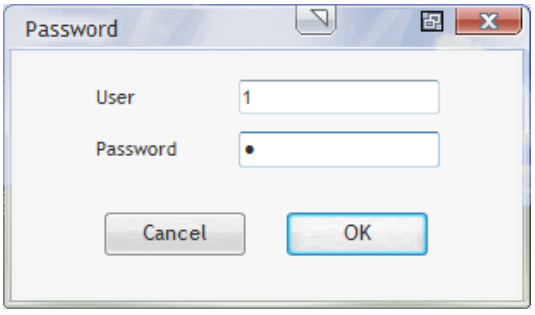


Figure 8.1.3

Complete the identification fields as follows;

User: 1
Password : 1

Then click on “OK”

The screen will now show a window with the list of all the constituent units of the installation.

Each of the modules will have an ID written on the side. Upon the commissioning of the installation, it will be necessary to record the IDs for each module, in order to allow their renaming at a later stage. The window will display the list of modules connected to the bus. The central unit will assign default designations to these modules. The ID column will display the ID numbers of modules, which are affixed to their respective housings. Each module may be identified in this list, and its designation may be modified.

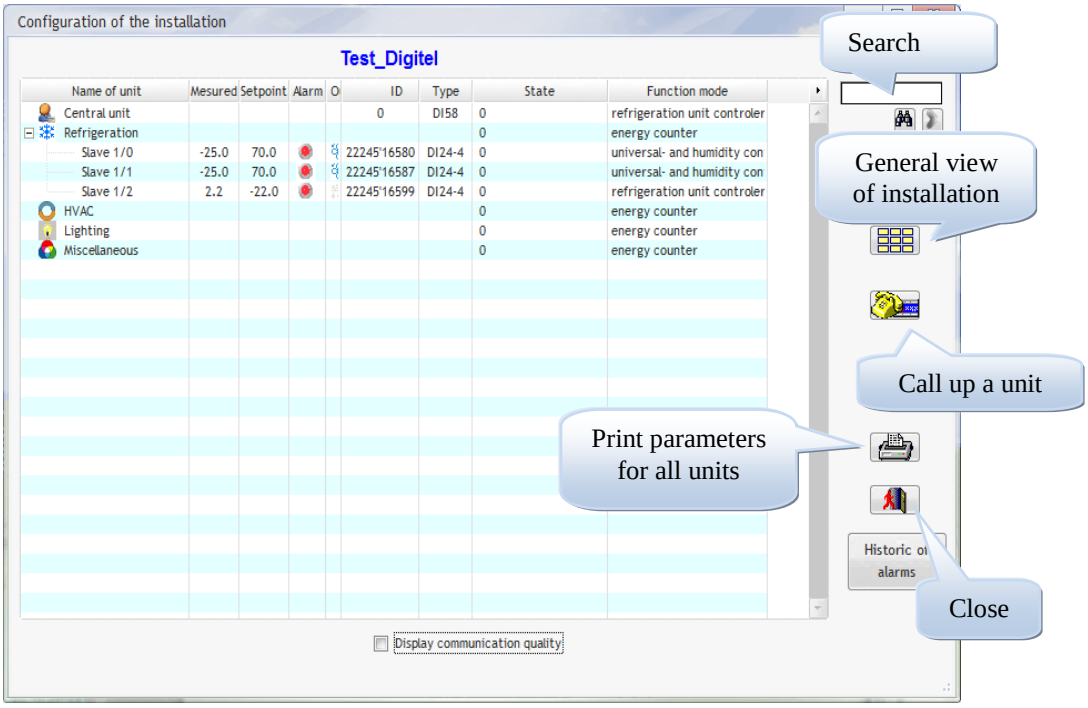
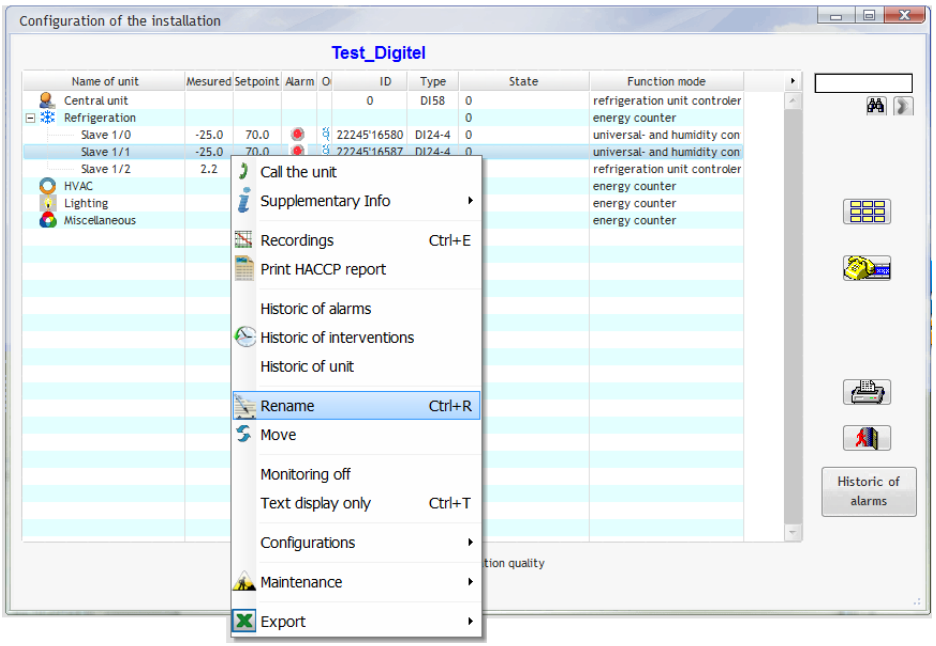


Figure 8.1.4



To rename a unit, right click on the unit in question, and then click on "Rename" in the scroll-down menu.

Figure 8.1.5

Depending upon the operating mode of the module called up, various views of the unit will be available. For example, connection with a cooling unit will open the following window:

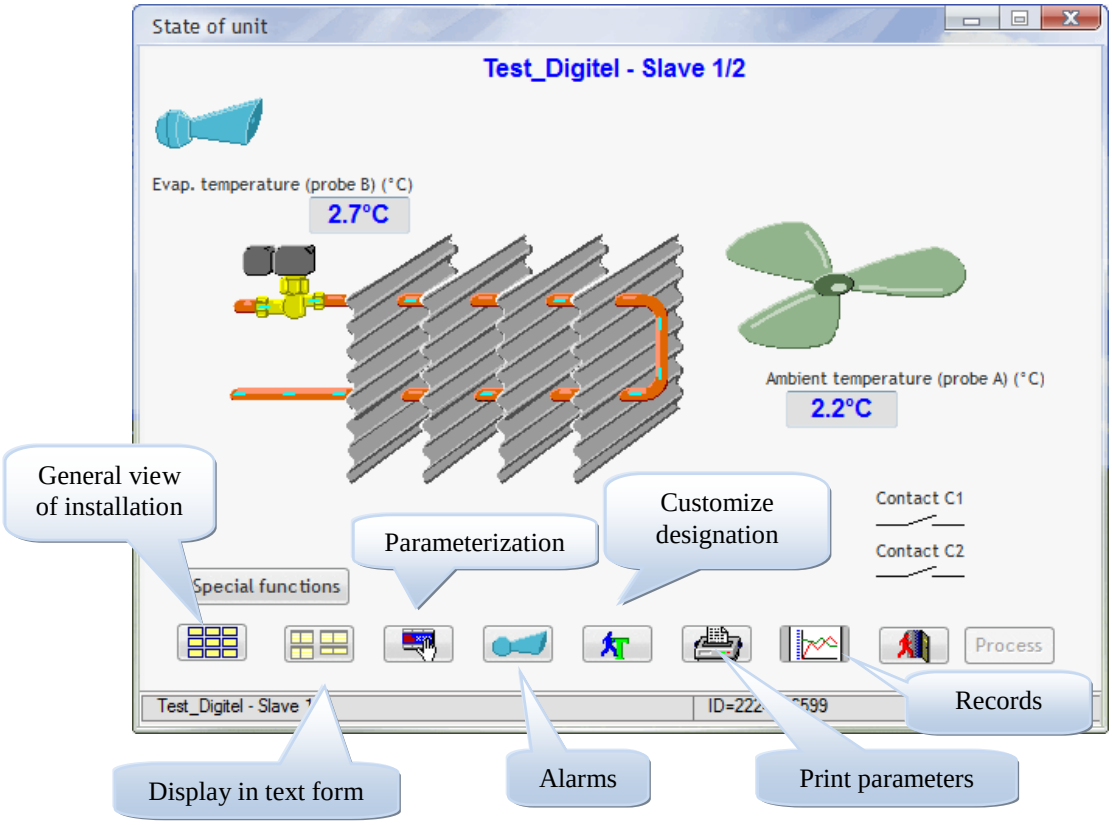


Figure 8.1.6

The “List of alarms” button will open the window displaying current alarms on the unit concerned.

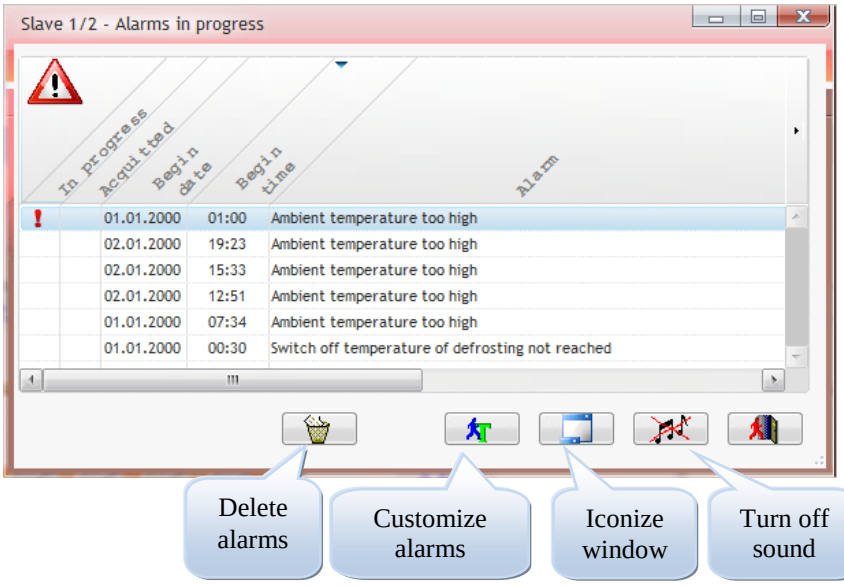


Figure 8.1.6

9. ***Customization***

9.1 Customization of alarms

The “Customize alarms” button in Figure 8.1.7 will open the following window:

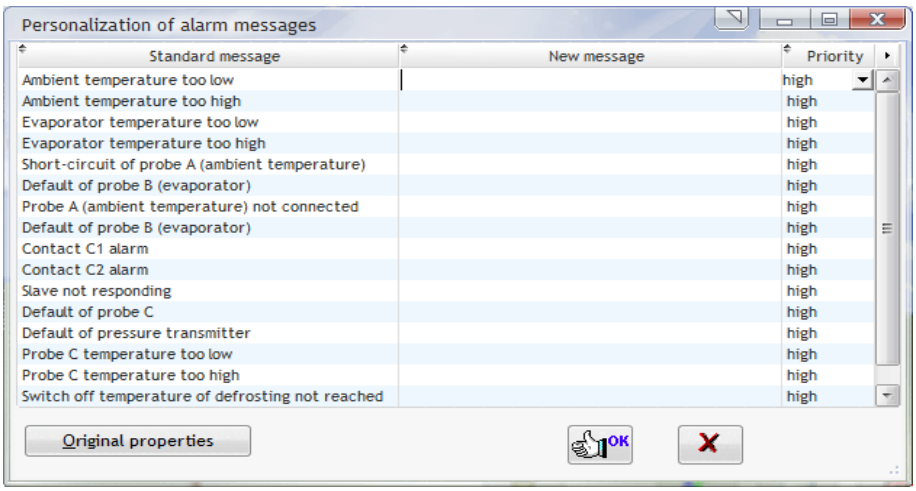


Figure 9.1.1

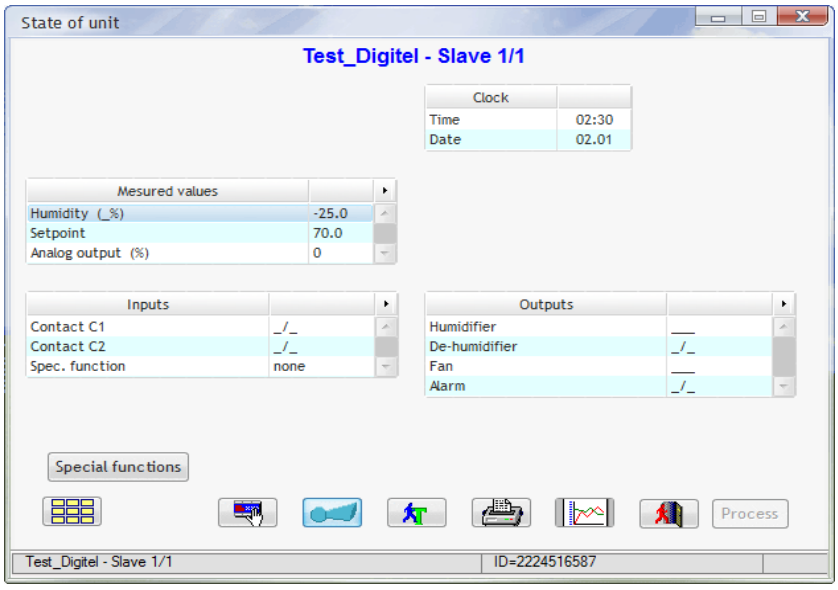
The standard alarm messages displayed on the left-hand side of the table will be replaced by customized messages, which can be entered in the “New message” column. Where this column is left blank, alarms will be displayed in the form of standard messages. Each alarm should be assigned a given priority in the “Priority” column.

All the customization operations described above will only apply to the unit which you are currently programming.

The “Original designations” button will restore all the default designations for the unit.

9.2 Customization of displayed values

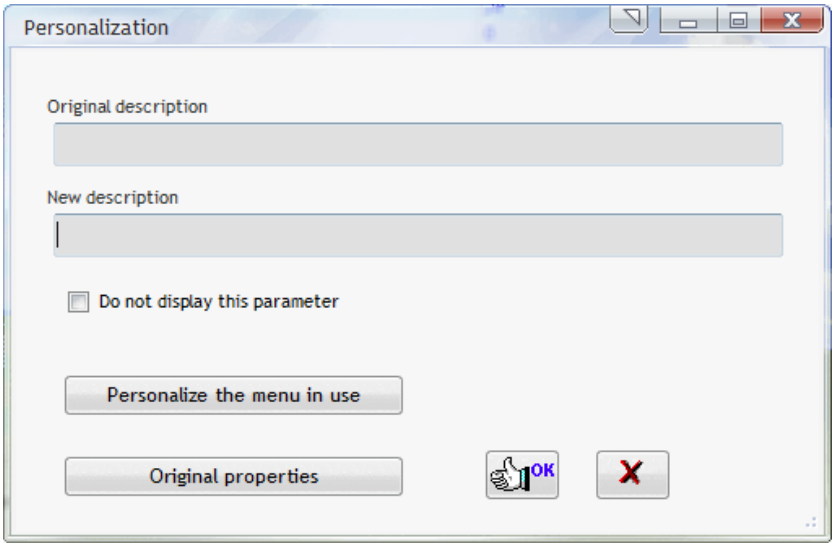
The “Customize designation” button in Figure 8.1.6 can be used for the modification of standard designations for displayed values, probes, input and output contacts. This button will open the window below.



To modify the designation of a given variable, click once on the variable whose designation is to be modified.

Then click on the “Customize designation” button – the following window will appear:

Figure 9.2.1



The first field indicates the designation of the parameter which you are about to modify.

The second field allows you to enter the new designation for the parameters selected.

By checking the box “Do not display this parameter”, the parameter concerned will no longer be displayed in the list (to restore this parameter, just click on the “Original characteristics” button).

Figure 9.2.2

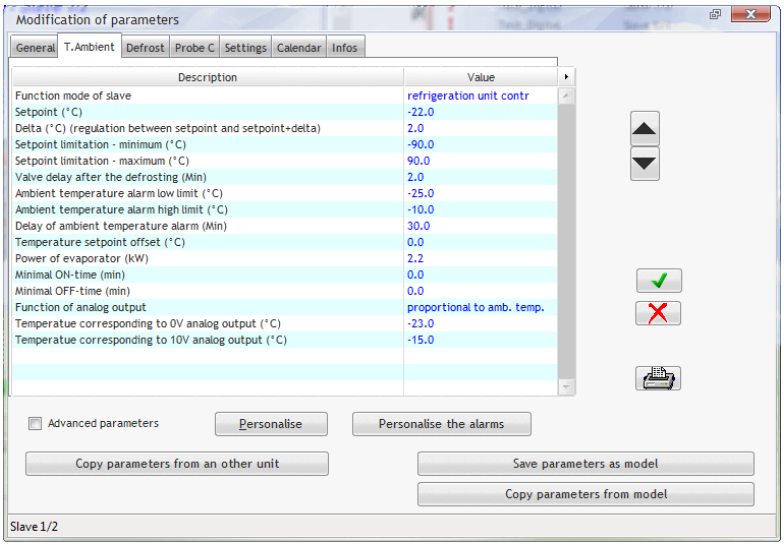
The “Customize current menu” button will the allow the modification of the tab which includes the parameter concerned, in this case the “Config.” tab. The tab can also be concealed by checking the “Do not display this menu” box (the check symbol will only appear if you click on the “Customize current menu” button).

The “Original characteristics” button will restore the original configuration. This button can also be used to restore the display of parameters concealed using the “Do not display this parameter” function.

After each modification, click on the “OK” button to confirm.

9.3 Customization of parameters

Click on the “Customize” button in Figure 10.1.1 to customize the parameters for a given unit.



To customize the designation of a parameter, select the line of the parameter to be renamed, and then click on “Customize”.

The window shown in Figure 9.2.2 will open. Proceed as per para 9.2 to modify the designation of your parameters.

Figure 9.3.1

10. General views

10.1 General views

General views will display all the units, or a group of units, in a given installation, on the same screen. To create a general view, go to the “Installation” menu, then to “modify an existing installation. This will open the following window:

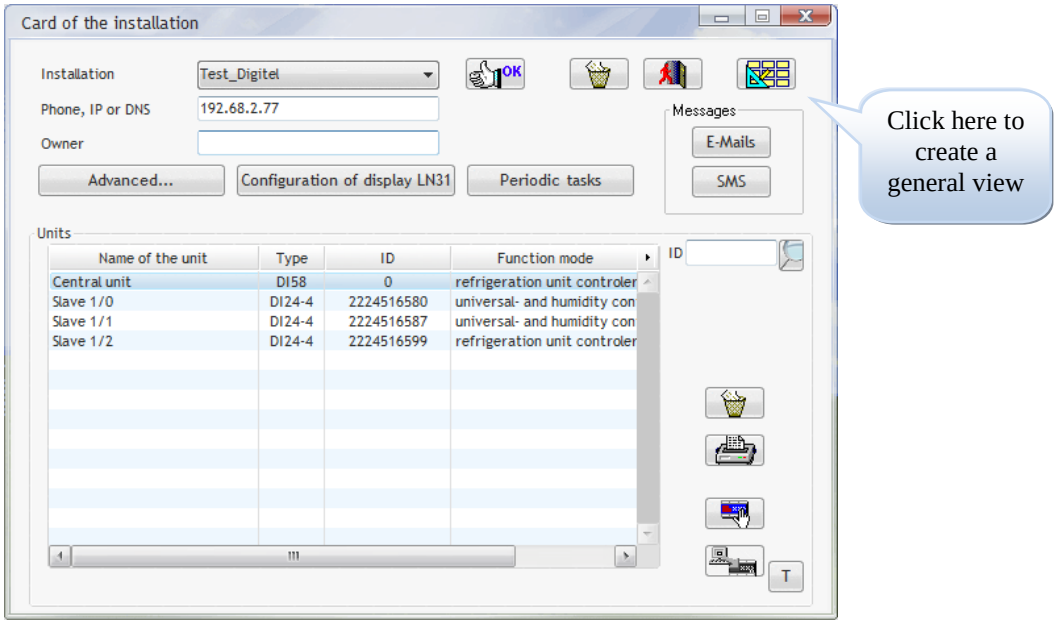


Figure 10.1.1

By clicking on the “Automatic generation of a new view”, it is possible to create a simplified view of all units in the installation, with the exception of regulators in surveillance mode. Each unit is represented by an indicator which will display the ambient temperature, pressure or hygrometry, according to the mode of operation concerned. The default designation of this new view, which will be “Auto 1-1” will be displayed in the table shown in the window.

It will also be possible to create your own views, which are better adapted to your requirements. To do this, click on “New view”.

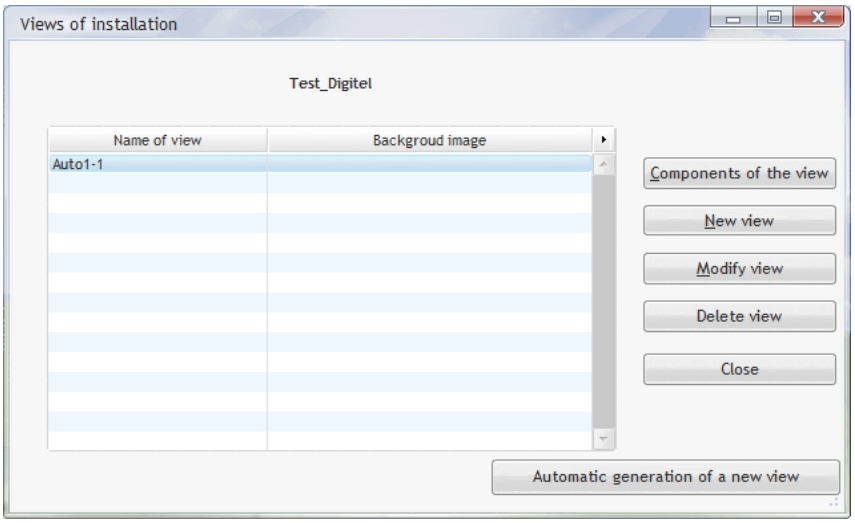


Figure 10.1.2

In the new window, enter the name to be applied to this view. Click on the “Select background image” button. This will open the file selection window. From this window, you can select an image which will be displayed as the background image to your new view. This image should be drafted beforehand using a drawing software, and saved on your hard drive in one of the formats which is recognized by TelesWin. The image concerned may be a digital photograph or an image which has been digitized using a scanner. TelesWin will accommodate the following formats: RLE, BMP, PCX, GIF, TIFF, JPEG, WMF, ICO, ICW. In principle, this image should comprise a schematic representation of the installation concerned. It is recommended that the image should be stored in a directory close to the “C:\” drive, in order to avoid an excessively long access link.

In the “Width” and “Height” fields, the size of the view can be modified. By default, this view will adapt to the size of your monitor. Click on “OK”.

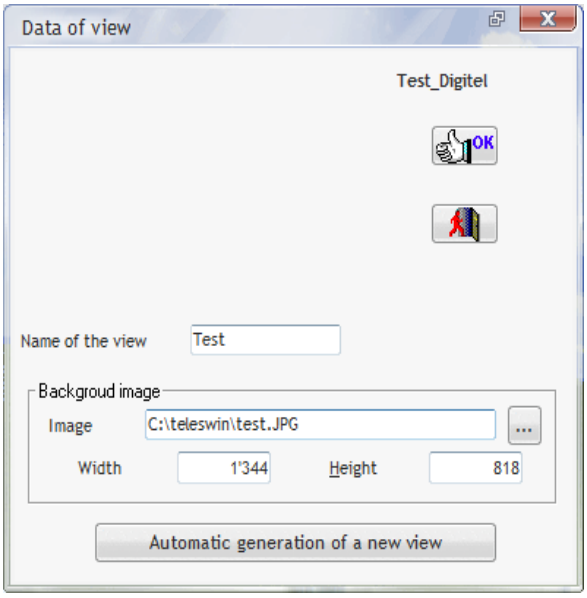
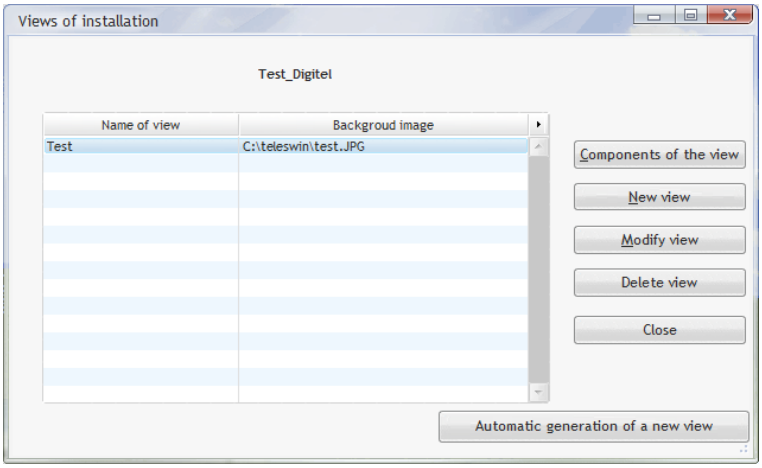


Figure 10.1.3



The new view will appear on the list. Select this view and click on “Components of view”. The view will be displayed on screen with the selected image.

Figure 10.1.4

Click on “New” to add indicators to the general view.

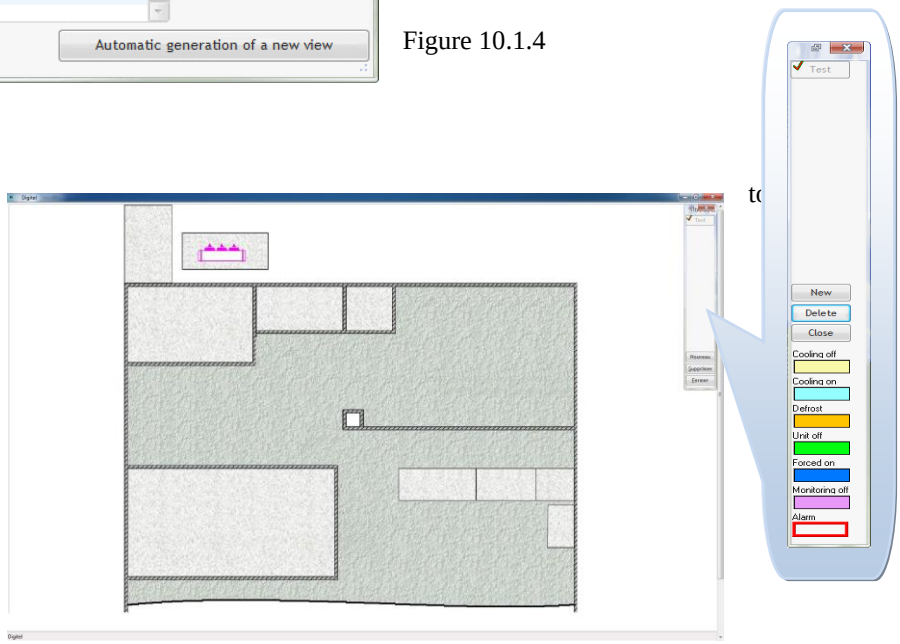


Figure 10.1.5

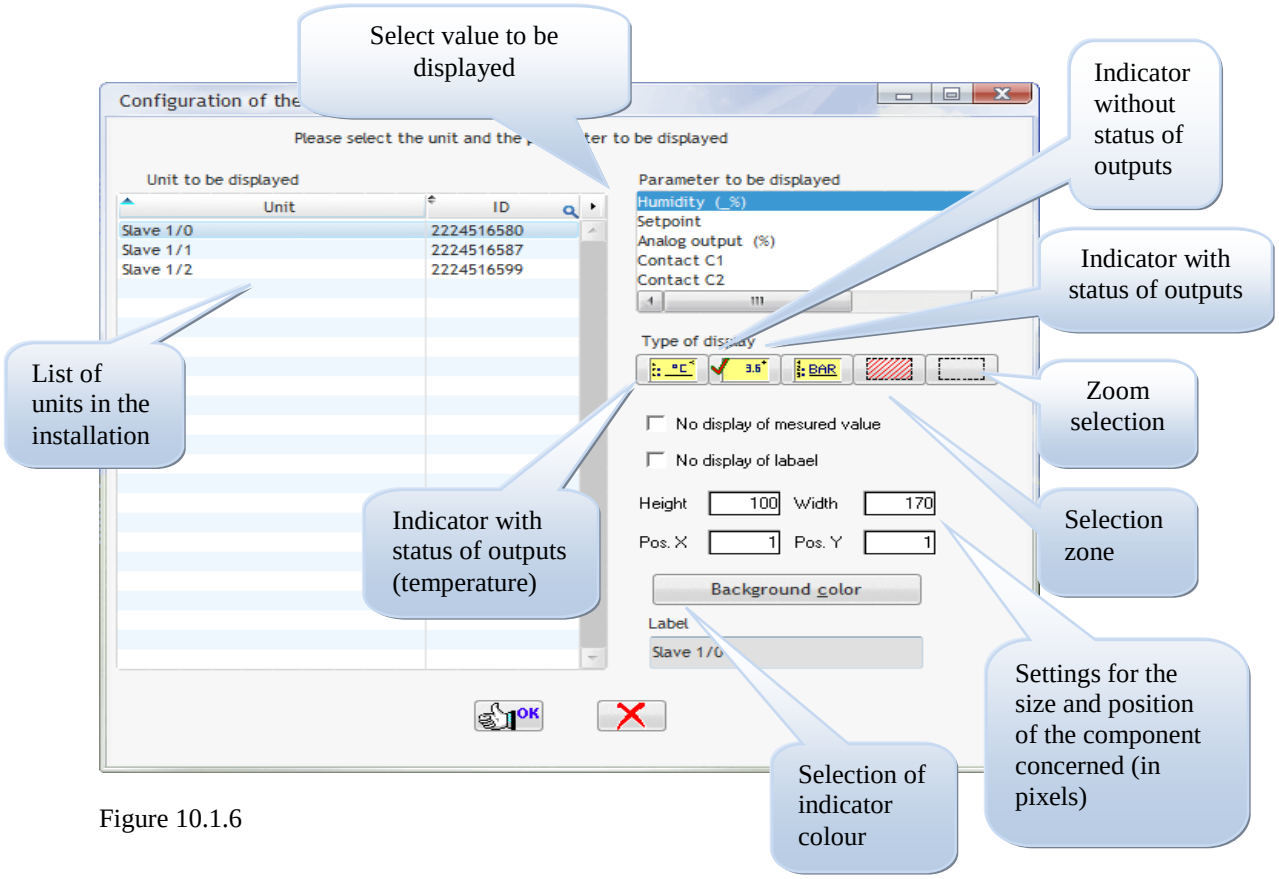


Figure 10.1.6

Firstly, select the unit, from the “Unit to be displayed” list, which the new component is to represent.

Then select the parameter which will be displayed for this unit, from the “Parameter to be displayed” list.

Now select the type of component from one of the indicators or selection zones shown. The selection zone will form a rectangle on the monitor, but will not be visible during subsequent operations. However, a mouse click on this rectangle will call up the unit represented by the zone concerned. Accordingly, where the selection zone is positioned on the illustration of a refrigeration cabinet, the user will be able to call up the module which manages this unit by clicking on the image.

It is also possible to create a zoom selection for the opening of a different view. This is particularly useful for large-scale installations. For example, you may have a general view of a store, with detailed views created for different parts of the store. By positioning these zoom selections on your general view, clicking on a given point in this view will open the detailed view of the location concerned. It will also be possible to position a zoom selection in a detailed view in order to return to the general view. These zoom selections will also be invisible.

The component designation will be initialized by TelesWin using the name of the unit concerned. This can be changed. The “Base colour” button will allow you to select the base colour for the indicator concerned. A palette of 48 colours will be available for this purpose, to which customized colours may be added. The most recent colour used will be applied by default to the following indicators. However, the base colours which you select will only be displayed if the option for “Indication of the status of units on synoptics” is unchecked (see Chapter 6, Figure 6.1.2), otherwise colours will be consistent with the status of the regulator concerned. For example, this component will be shown in sky blue if refrigeration is in progress, or in orange if the unit is in defrost mode.

Click on “OK” to validate the configuration of the component shown in the view.

The component selected will be displayed in the top left-hand corner. Its size can be changed by moving the cursor onto the size-change buttons, which can be moved with the left mouse button held down. To move the component, position the mouse cursor on the component concerned, hold down the left mouse button and drag the component to the desired position with mouse button held down. In this way, the component can be moved to the position where the corresponding unit is represented.

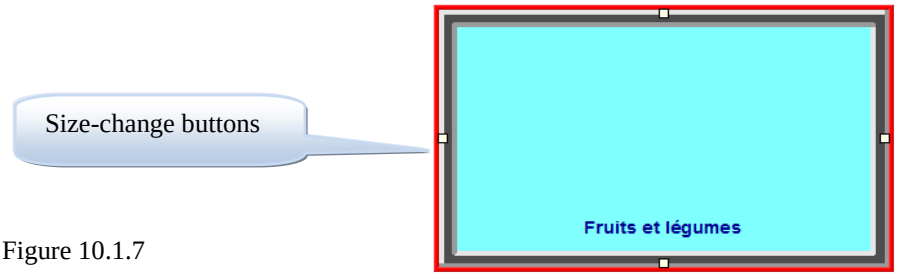
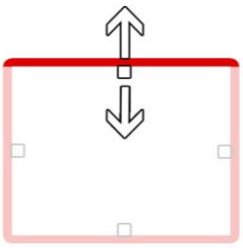
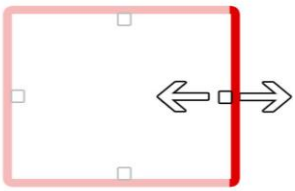


Figure 10.1.7

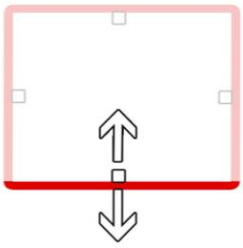
However, for greater accuracy, it is recommended to proceed as follows:



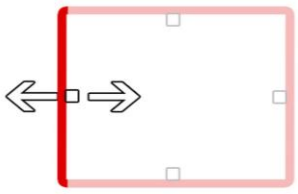
To resize the frame using the upper segment only, apply the following combination:
"**Shift** + up/down arrow"



To resize the frame using the right-hand segment only, apply the following combination:
"**Ctrl** + left/right arrow"



To resize the frame using the lower segment only, apply the following combination:
"**Ctrl** + up/down arrow"

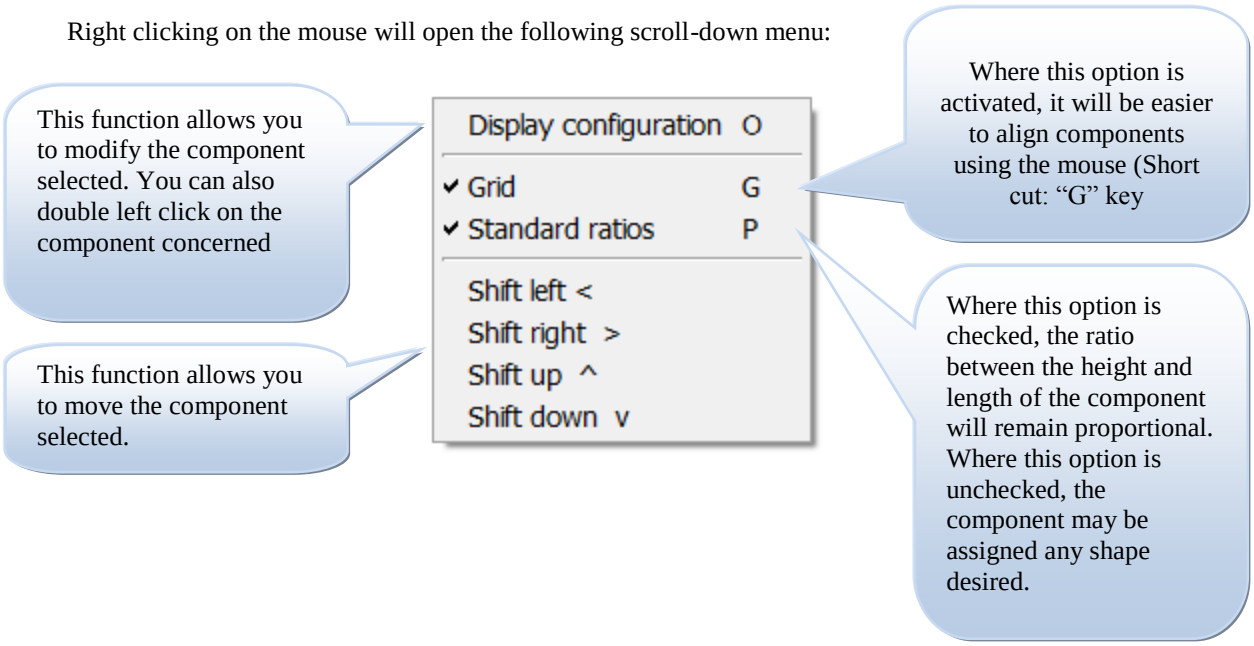


To resize the frame using the left-hand segment only, apply the following combination:
"**Shift** + left/right arrow"

Figure 10.1.8

The size and position of the component can also be accurately parameterized in the configuration window for the view of the component concerned (see Figure 10.1.6).

Right clicking on the mouse will open the following scroll-down menu:



Repeat the same procedure for all the components which you wish to be included in the view screen. For example, this might result in the following window:

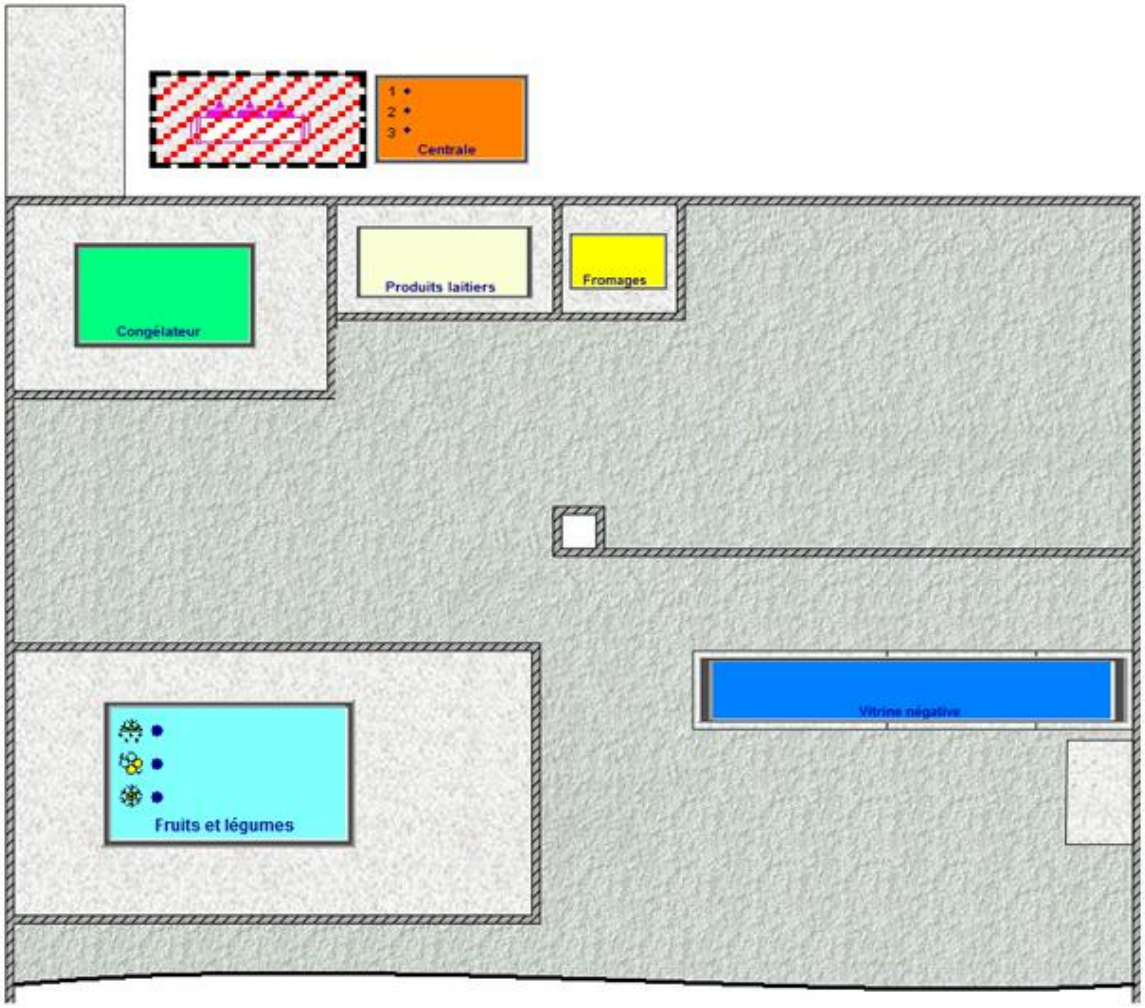


Figure 10.1.10

This screenshot represents the view of an installation. We have included a number of indicators and an invisible selection zone which can be used to call up the module which manages the central unit concerned.

Clicking on the indicators will call up the corresponding unit, and will display full details of its operation.

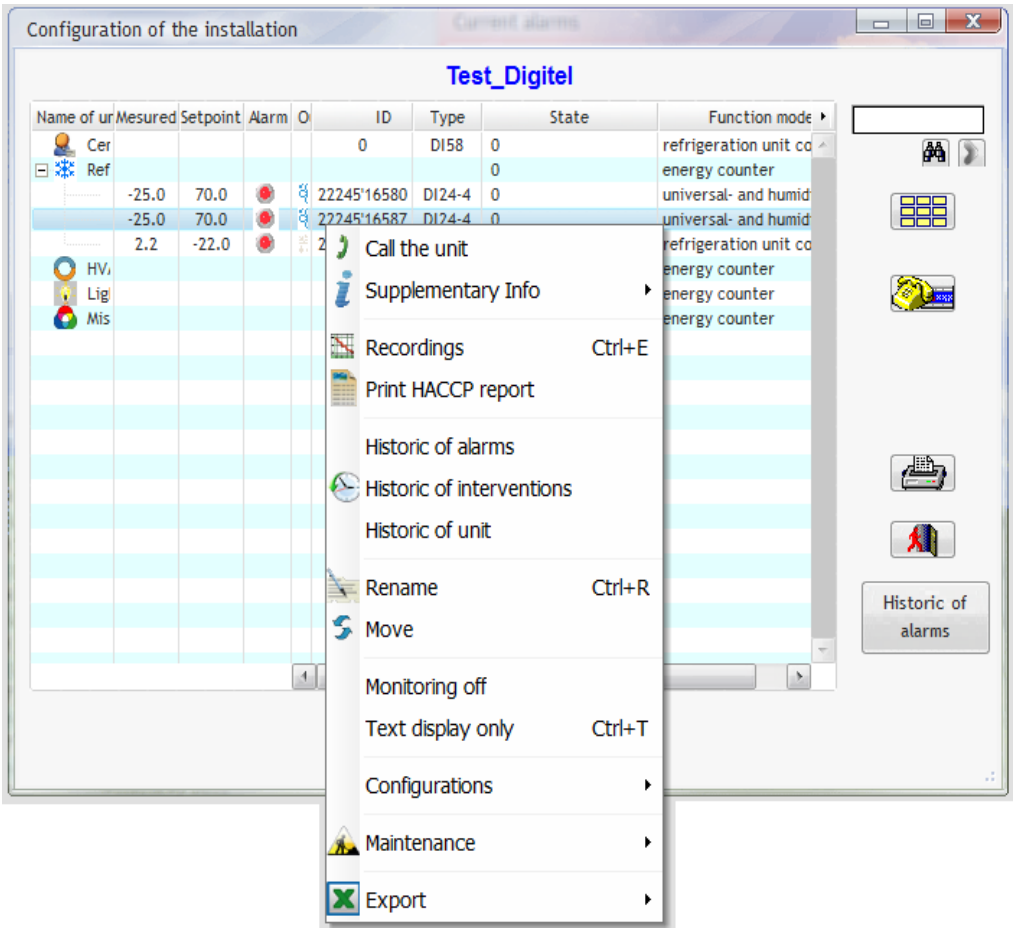
The call-up of units by clicking on components will not function at this stage. These functions will be operational on the views displayed in the course of communication with the installation.

There may be as many as 10 different views of a single installation.

*11. **Basic functions***

11.1 Basic functions

This chapter describes the basic functions and processes which can be executed on TelesWin. Firstly, we will describe all the processes which can be completed from the main “Installation configuration” window, which will open when the installation is called up.



In the configuration window, you may right click on one of the units. This will open a scroll-down menu which includes the following process options:

Figure 11.1.1

11.2 “Call-up unit”

Figure 11.2.1

Clicking on “Call-up unit” will open a detailed window showing all the parameters for the unit in question. This process may also be completed by double clicking on the unit concerned, or by selecting the latter (with a single click) then clicking on the “Call-up unit” button on the right-hand side of the window.

11.3 “Supplementary info”

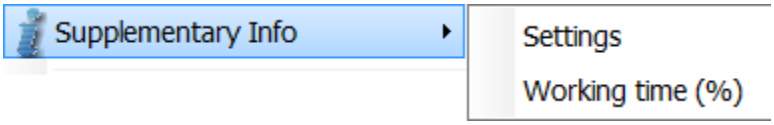
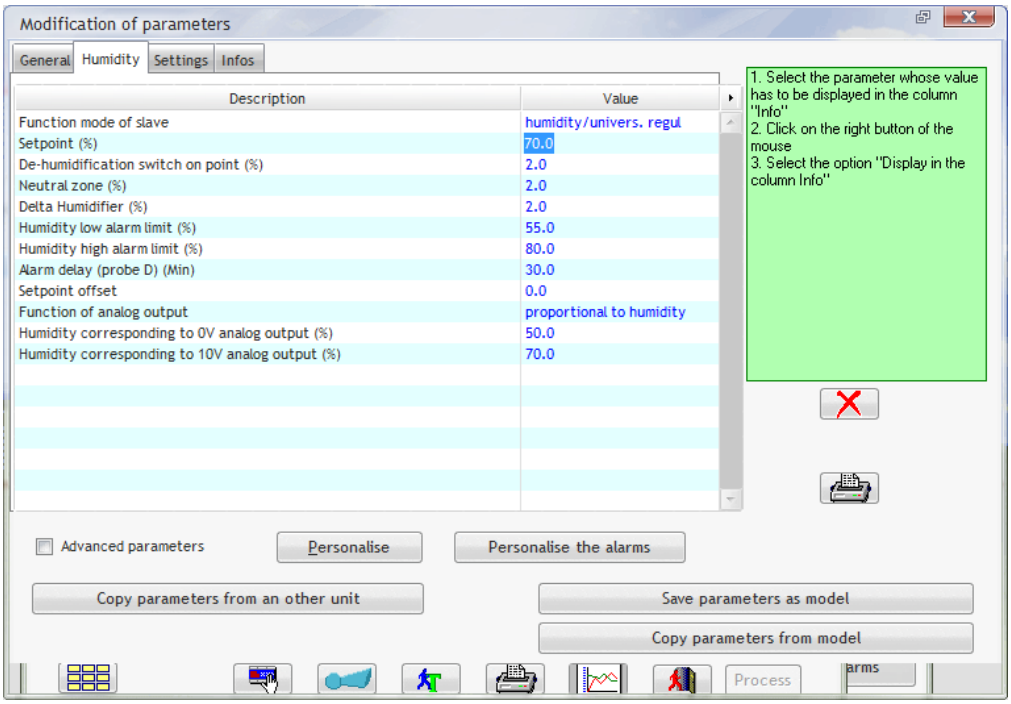


Figure 11.3.1

11.4 “Supplementary info”/ “Parameters”

By clicking on “Parameters”, TelesWin will connect to the unit concerned, and the following window will open:



By following the detailed procedure described in the green box, this window will allow the display of an additional parameter in the “Info” column of the “Installation configuration” window.

Figure 11.4.1

11.5 “Supplementary info”/ “Run time”

By clicking on “Run time”, TelesWin will display the run time of cooling units, as a percentage, in the “Info” column.

11.6 “Records”

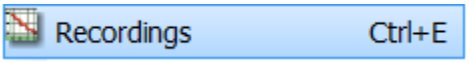
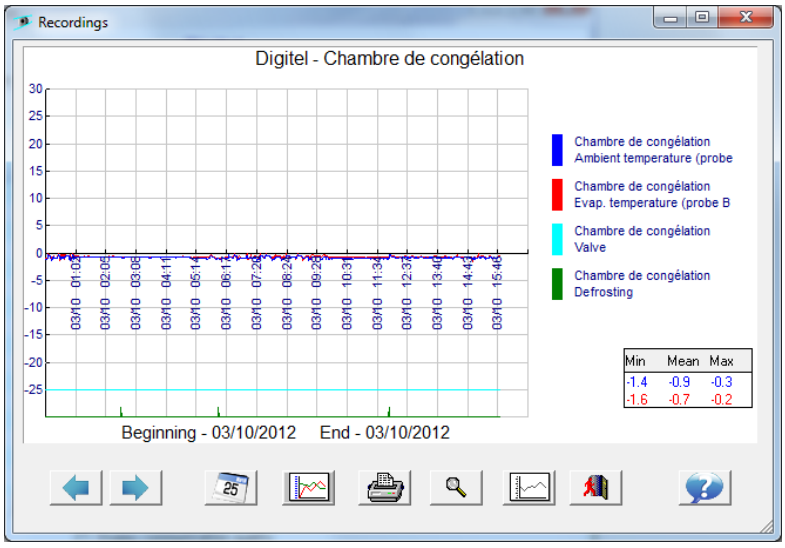


Figure 11.6.1

To call up the records for a given unit, click on “Records” or press “Ctrl+E”. The following window will open.



TelesWin will import all records for that day into the PC, and will display them in the form of a chart, which may be analyzed using a number of tools.

Figure 11.6.2
Firstly, we will consider functions associated with frequency.

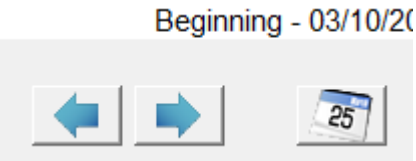


Figure 11.6.3

The start date and the end date of records will be shown at the bottom of the window. By default, times will be displayed on the graphic. To modify the recording period, two options are available:

- Click on one of the arrows, which will alter the date by one day
- Click on the calendar icon to select the period which you require.

We will now describe the functions associated with variables.

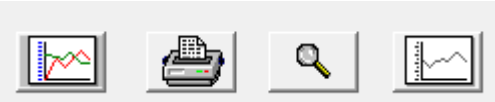


Figure 11.6.4

A number of options are available at the bottom of the window.

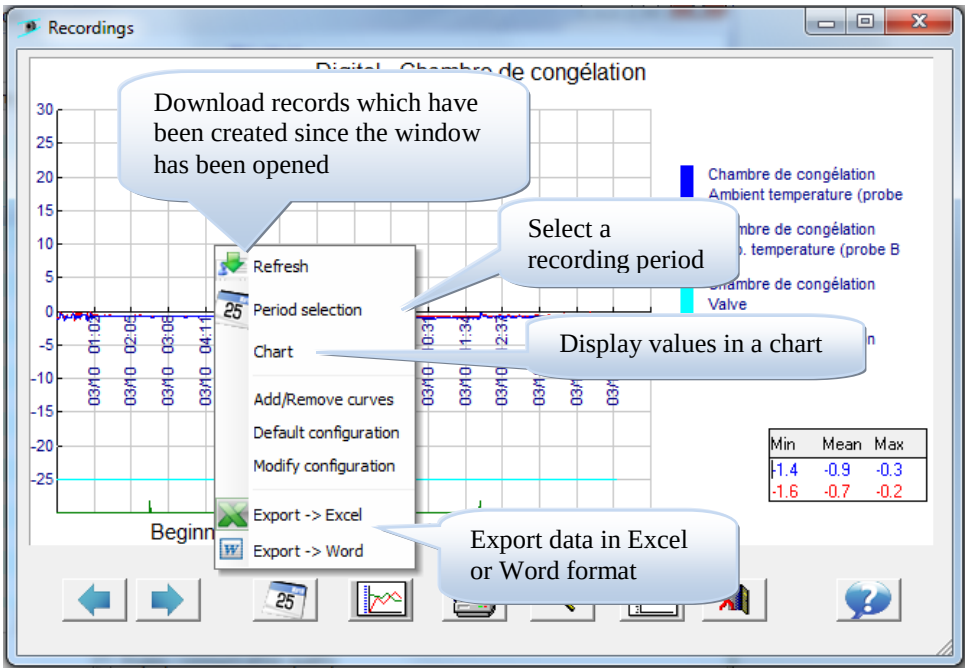
The button marked with a blue chart allows variables to be displayed in the form of a chart.

The printer button will allow variables to be printed in the form of a diagram or table (print functions executed by the printer will be governed by the form of display which you have selected).

By clicking on the zoom button (magnifying glass), instructions for zooming into a given point on the diagram will be explained. Once the process is complete, this function can also be used to reinitialize the default display.

The last button will add or delete limiting values programmed in the configuration of records.

Other functions may be called up by right clicking on the window.



Balloon captions:

Download records which have been created since the window has been opened

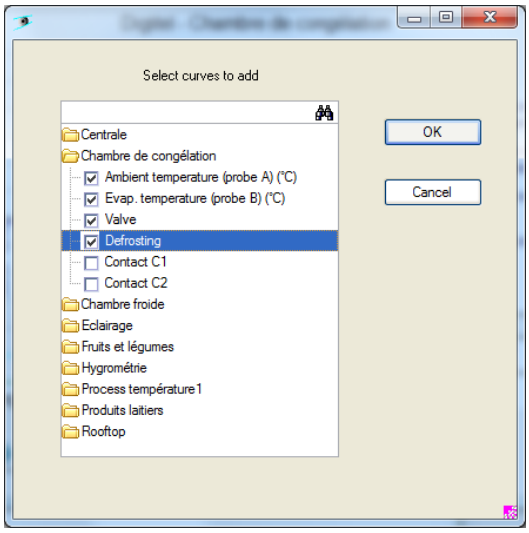
Select a recording period

Display values in a chart

Export data in Excel or Word format

Figure 11.6.5

The curves represented will be selected by TelesWin on a default basis. This configuration can be modified – it is possible to add or remove curves for the module concerned, or even for a different module.
Clicking on “Add/Remove” curves will open the following window:



In this window, you may select each parameter for each unit, which will then be shown on the graphic display, for the purposes of comparison or simply for the analysis of variables. Simply check or uncheck as required.

The search tab, right at the top, will assist in the location of a specific unit.

Once you have selected the parameters required, confirm by clicking on “OK”.

Figure 11.6.6

If you click on “Default configuration”, TelesWin will restore the default display of parameters.

Clicking on “Modify configuration” will open the following window:

It is possible to modify the display of each curve, set limiting values, define the maximum/minimum scale, add parameters to the list or even change the colour of curves.

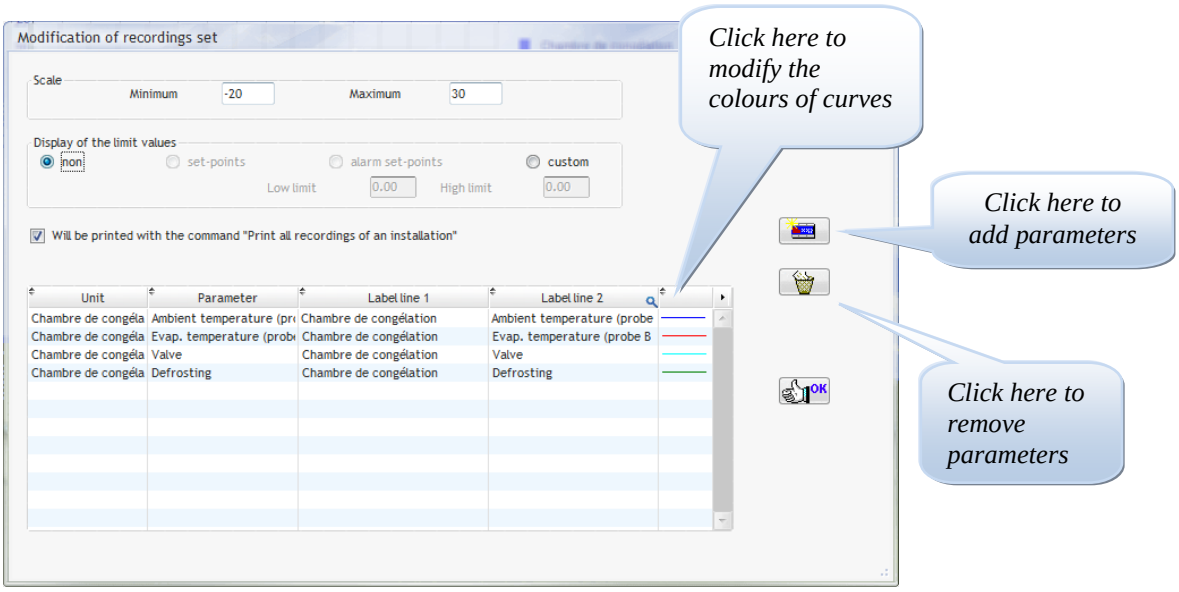


Figure 11.6.7

11.7 “Print HACCP protocol”

This function can be used to print out the main parameters for each unit, in accordance with the requirements of the HACCP protocol.

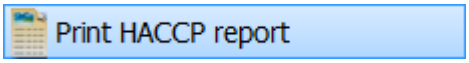


Figure 11.7.1

11.8 "Operations history"

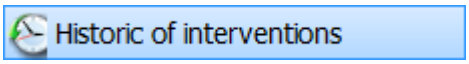
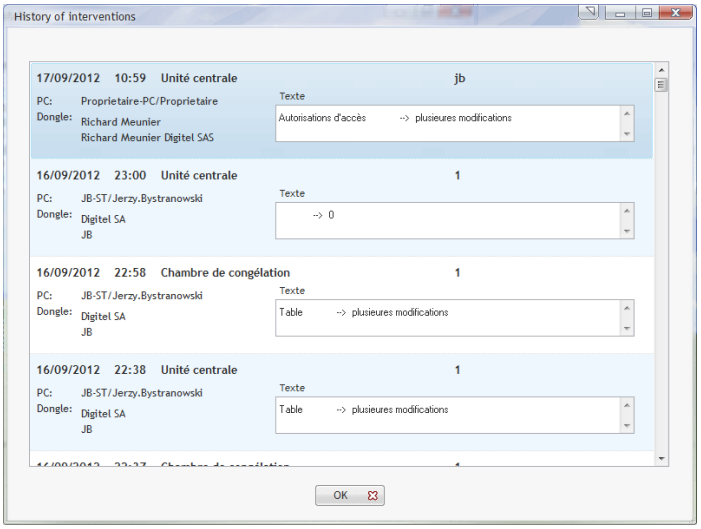


Figure 11.8.1

Clicking on "Operations history" will open the following window:



This window will display all the processes which have been executed on all units, the originator of modifications, the PC from which these modifications have been executed and the Dongle used for this purpose.

Figure 11.8.2

11.9 "Unit history"

Figure 11.9.1

This window will display all the processes which have been executed on the unit selected, the originator of modifications, the PC from which these modifications have been executed and the Dongle used for this purpose.

11.10 “Monitoring off”

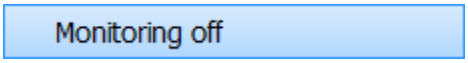


Figure 11.10.1

By clicking on “Monitoring off”, you will deactivate the monitoring function for the unit concerned – this may be useful where the latter is transmitting known alarms which are in the course of processing. The corresponding line in the “Installation configuration” window will then be displayed in red.

While the monitoring function is out of service, the unit will generate no alarms and information on its operating status will not be available.

Monitoring will be restored by repeating the procedure for monitoring function out of service. You will observe that, by right clicking on the unit on which the monitoring function is out of service, the title of the function will change to “Monitoring off”.

11.11 “Rename”

Click here to rename a unit.

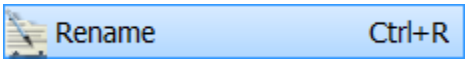


Figure 11.11.1

11.12 “Move”

Figure 11.12.1

This function will allow the alteration of the position of regulators in the “Installation configuration” menu.

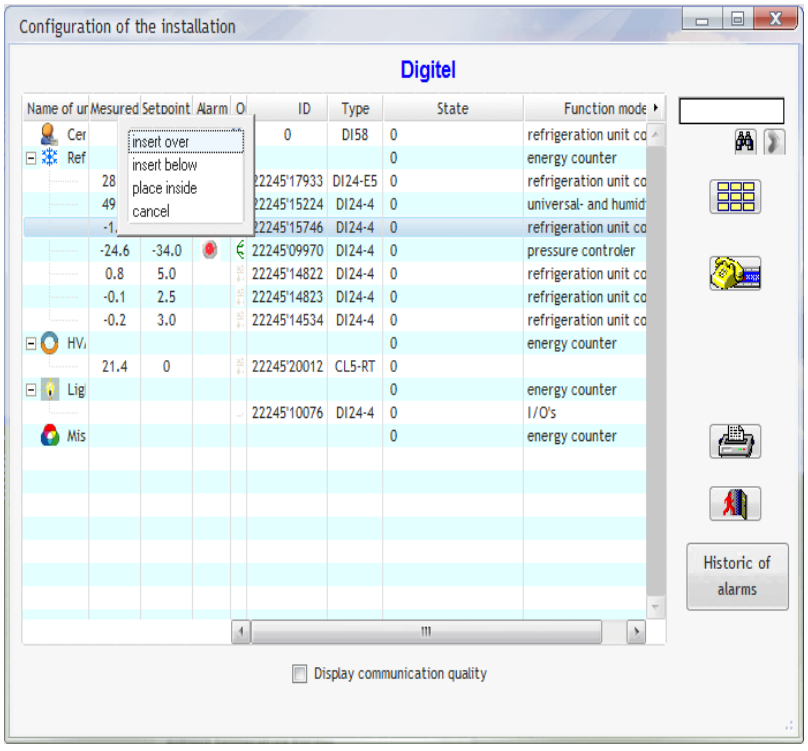


Figure 11.12.2

Once this function has been activated, it is possible to move the mouse for the selection of a given category or a given regulator. By clicking on either, the module may be positioned according to the following options:

- Above the line clicked on
- Below the line clicked on
- Within the line clicked on

This last option may vary, according to the position of the module:

By clicking on a given category, e.g. Heating, Ventilation & Air-conditioning [“CVC”] or Miscellaneous, the module will simply be positioned in the category concerned.

If another regulator has been clicked on, the latter will become a directory which will include the module which has been moved. This may prove useful for the grouping of regulators.

11.13 “Display text only”

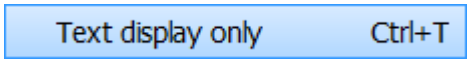


Figure 11.13.1

By clicking on “Display text only”, Teleswin will confirm the click by displaying a check symbol to the left of “Display text only”. This function will allow the viewing of parameters for the unit called up in text form only, with no images, in order to increase the quantity of information visible.

To deactivate this function, repeat the display procedure. Once completed, the check symbol will disappear.

11.14 “Configuration”/ “Refresh configuration”

Figure 11.14.1

By clicking on “Refresh configuration”, TelesWin will download the configuration from the DI58 in order to display any changes which have been made by another user during your connection.

11.15 “Configuration”/ “Send, import configuration: PC -> site, site -> PC

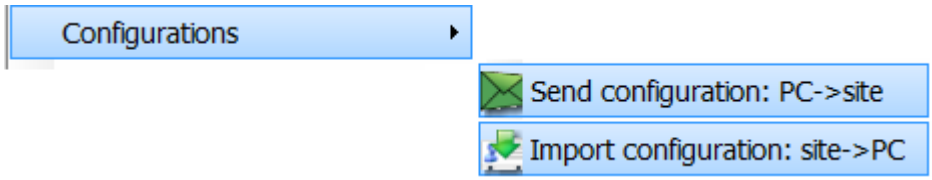


Figure 11.15.1

Where modifications are made to an installation from a PC, these will only be submitted to the central unit upon the interruption of communication with the latter. To apply these changes while still connected, click on “Send configuration from PC -> Site” [“Envoyer configuration PC -> Site”]. The PC -> Site function will submit changes to the DI58, which will then be incorporated into the PCs of other users upon their next connection.

11.16 “Maintenance”/ “Restore a previous configuration”

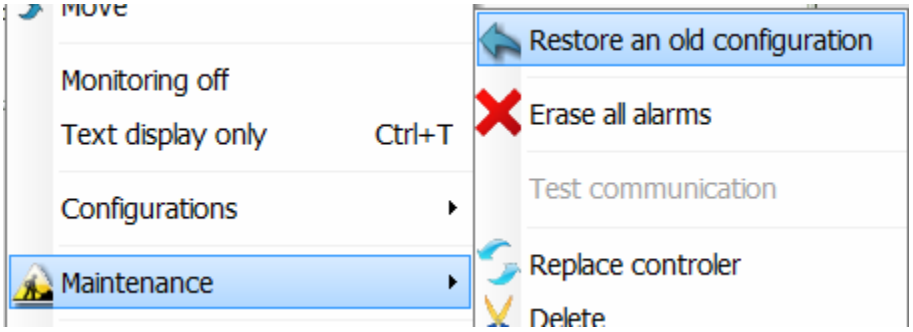


Figure 11.16.1

The central unit will regularly save the configuration of your installation (Name of terminals, customizations and the order of appearance of the latter). Using this function, it will be possible to retrieve a saved version at a later date.

Select the date of saving to retrieve the desired configuration.

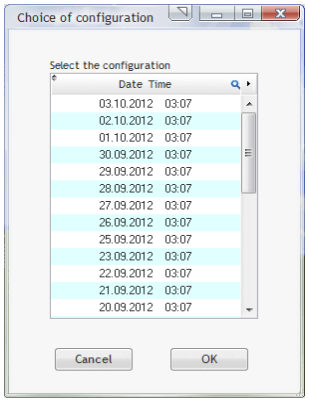


Figure 11.16.2

11.17 “Maintenance”/ “Replace module”

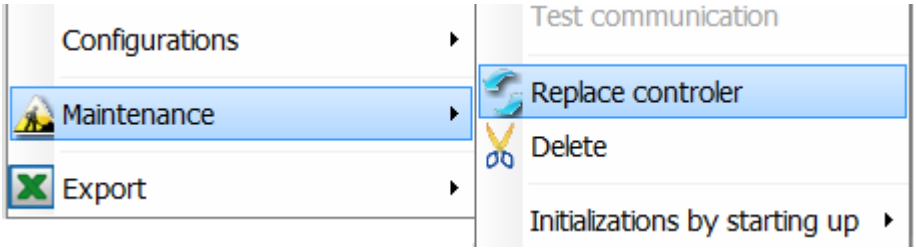


Figure 11.17.1

To replace a module, the use of this function will be mandatory. Firstly, the module to be replaced must be removed from the bus and replaced by the new module. During the execution of this function, the software will complete the following tasks:

- Copying of parameters from the old module into the new module
- Change of designation of the new module
- Deletion of the old module from the list of units.

For example:

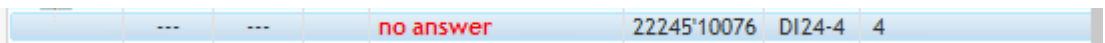


Figure 11.17.2

Clicking on “Replace module” will open the following window:

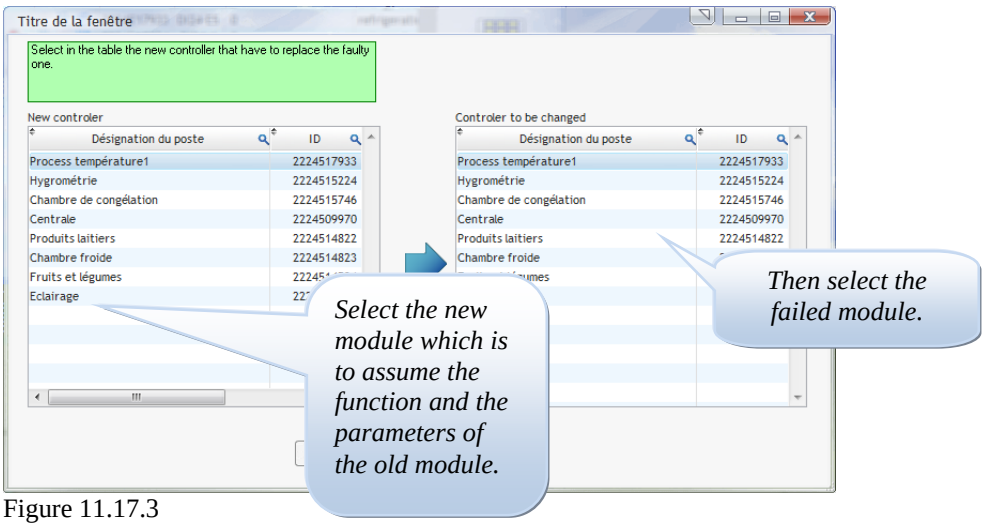


Figure 11.17.3

11.18 “Maintenance”/ “Delete”

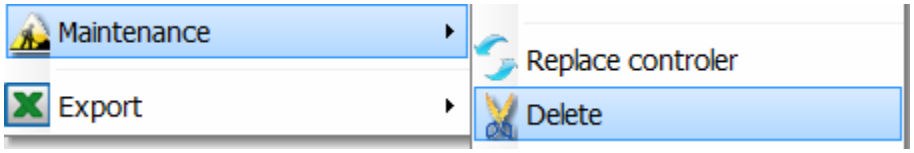


Figure 11.18.1

By clicking on “Delete”, you will delete the unit selected from the list. If you delete a module which is still connected to the DI58, this module will be automatically restored to the list after a few minutes.

11.19 “Maintenance”/ “Initialization functions upon commissioning”/ “Add a slave unit”

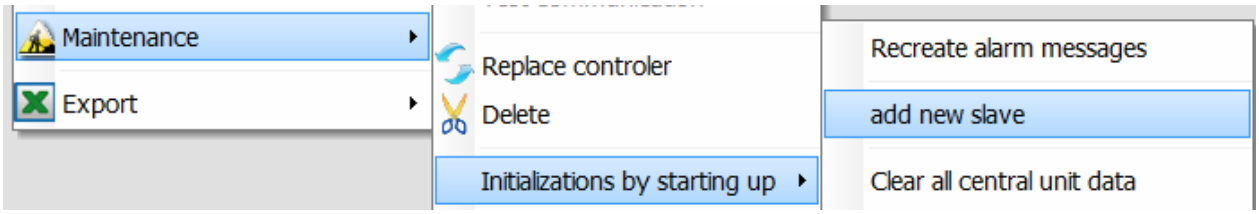
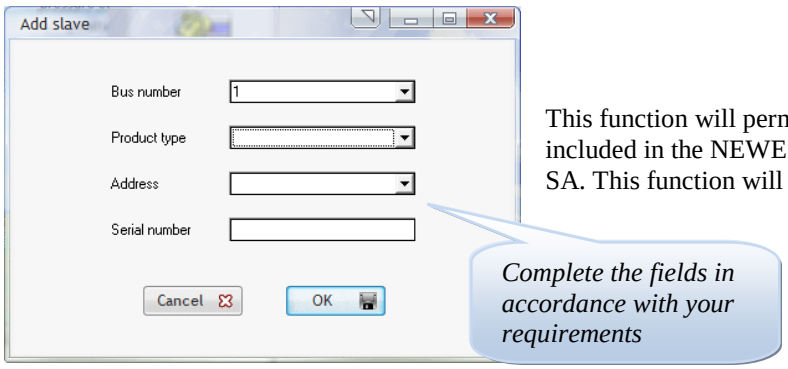


Figure 11.19.1
Clicking on “Add a slave unit” will open the following window:



This function will permit the addition of modules which are not included in the NEWEL 2 range, but are recognized by Digitel SA. This function will allow e.g. the addition of energy meters.

Figure 11.19.2

11.20 “Maintenance”/ “Initialization functions upon commissioning”/ “Delete all data from central unit”

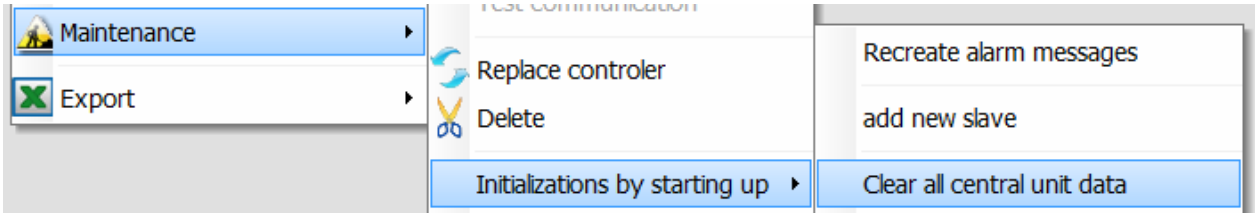


Figure 11.20.1

This function will delete all data from the central unit. After restarting, the central unit will execute an automatic search for all units connected to the latter. This operation may take a few minutes.

11.21 “Maintenance”/ “Initialization functions upon commissioning”/ “Recognition of new slave units”

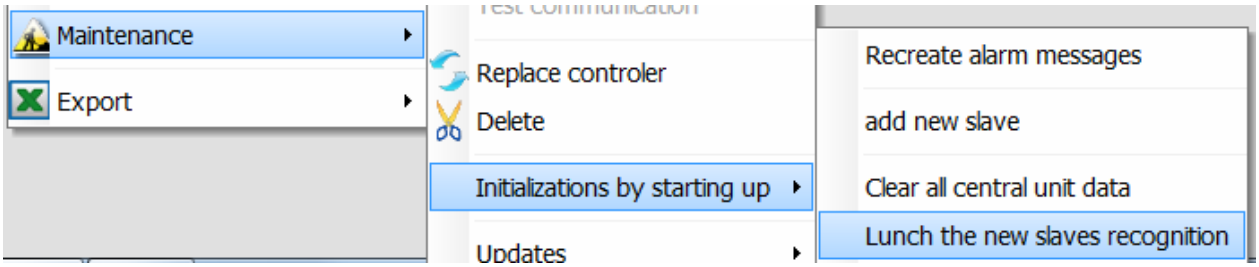


Figure 11.21.1

This function will permit the central unit to complete the more detailed identification of new modules. Upon the connection of a number of new modules, it is possible that certain modules will share the same address. This operation will permit the central unit to identify any such cases, and to allocate new addresses to modules which share a common address.

11.22 “Maintenance”/ “Initialization functions upon commissioning”/ “Importing of data from a DI48 installation”

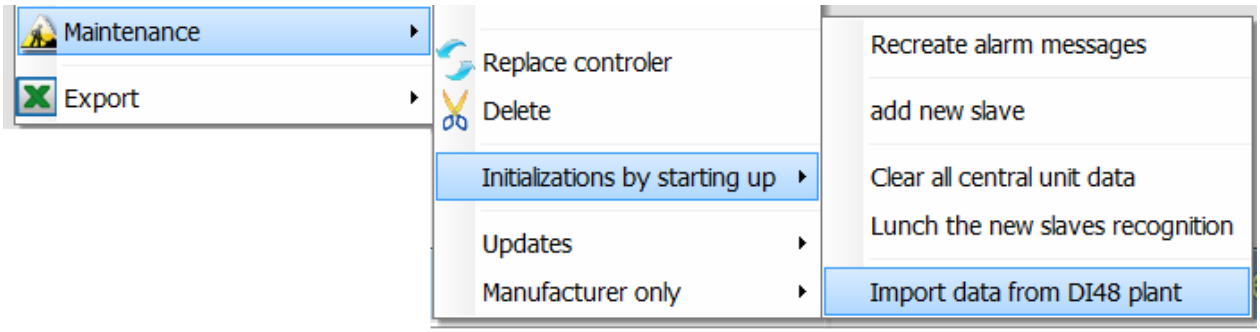


Figure 11.22.1

The function will permit the retrieval of an existing installation managed by a DI48 for importing into a DI58. All units and their associated parameters will be preserved. This operation will be extremely useful, should you decide to upgrade your existing installation by replacing the DI48 central unit with a DI58 central unit.

11.23 “Export”

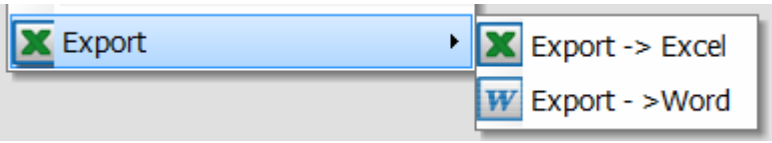


Figure 11.23.1

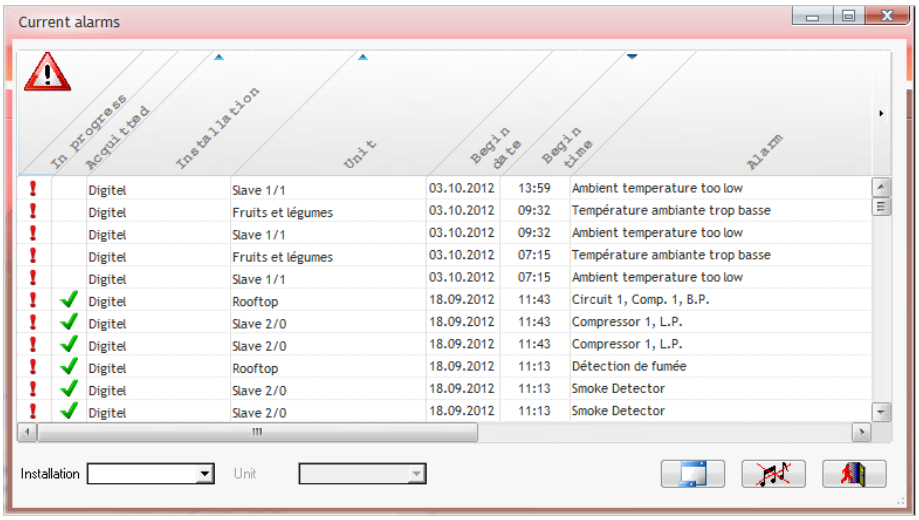
These functions will permit the copying of data from all units into a Word file or an Excel spreadsheet.

12. Alarms

12.1 Alarms

This chapter describes all the information which can be accessed from the various alarm windows.

The alarm window, which will open upon the start-up of TelesWin, will notify you of all unacknowledged or current alarms on each of your installations. This window will be comprised of numerous sort functions, which will permit the rapid location of specific alarms.



At the top of the menu, various tabs are available for the reorganization of the display. By clicking on these tabs, it is possible for alarms to be displayed in ascending or descending order.

Figure 12.1.1

At the bottom of the menu, there are two scroll-down menus. The “Installation” menu will allow the display of alarms for a specific installation only. Once an installation has been selected, the “Unit” tab will allow you to select a given unit, in order to display the alarms associated with that unit only.

The two buttons at the bottom right will allow you to turn off the sound of alarms and exit the window.

By right clicking on the list of alarms, you will open a scroll-down menu which will allow the execution of the following processes:

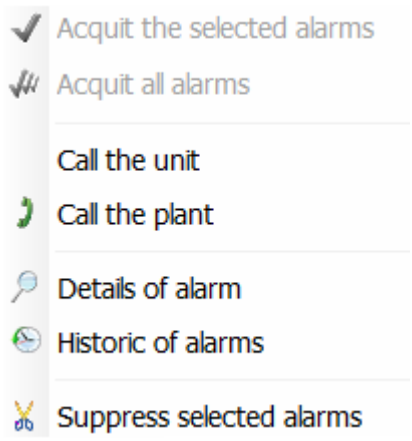
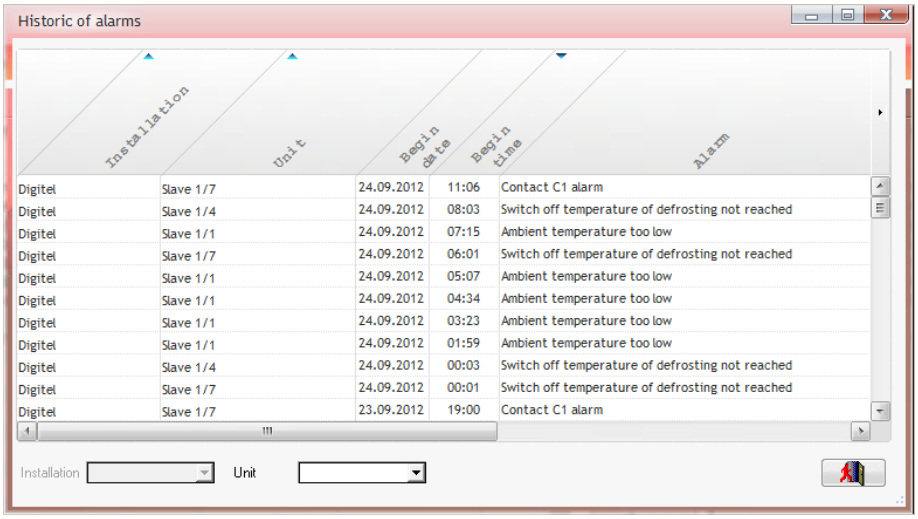


Figure 12.1.2

Alarm acknowledgement functions will only become operational once you are connected to the installation. We would strongly advise you to regularly acknowledge alarms processed, in order to restrict the number of alarms to be downloaded upon start-up, thereby accelerating the connection to an installation.

“Alarm details” will open a window containing more specific information on the alarm concerned, including: the start date/end date, person responsible for acknowledgement, time of acknowledgement, etc.

The “Alarm history” function will open the following window:



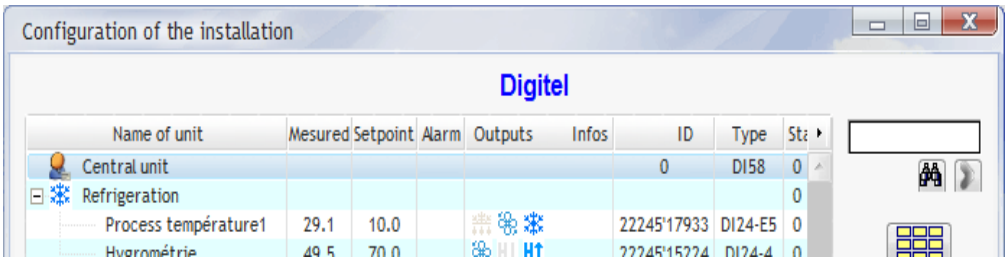
This window will have the same properties as the previous window, but will include all the alarms which have occurred since the commissioning of the installation. Only alarms which are no longer current and have been acknowledged will be included in this list.

Figure 12.1.3

13. Functions of the DI58 central unit

13.1 Function of the DI58 central unit

This chapter describes all the functions which are available on the DI58.

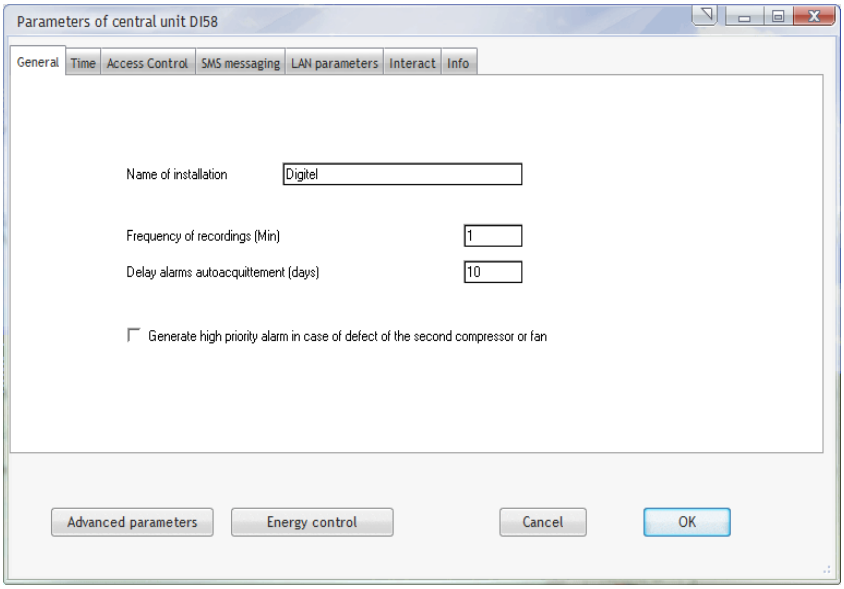


Double click on the "Central unit" ["Unité centrale"] line highlighted.

Figure 13.1.1

This will open the following window:

13.2 "General"



In this window, TelesWin will display a number of basic parameters which may be modified at any time, including:

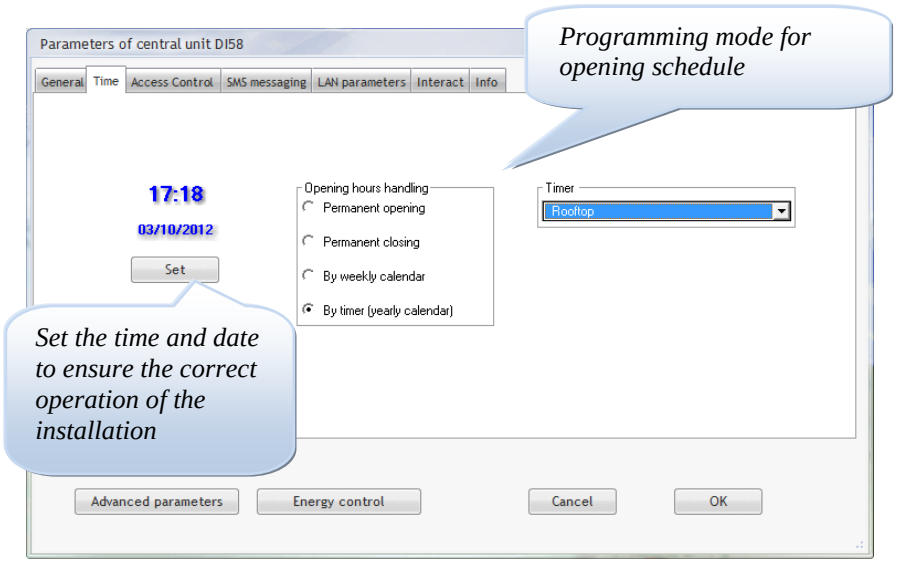
- the name of the installation
- the frequency of recording
- the automatic alarm acknowledgement time

Figure 13.2.1

You can also check the function "Generate a high priority alarm in case of a fault on the 2nd compressor/fan" ["Générer une alarme de haute priorité en cas de défaut du 2ème compresseur/ventilateur"] to enhance the security of your installation.

13.3 “Clock”

The “Clock” tab can be used for the setting of the system time and the parameterization of the opening schedule for the installation.



By the selection of “By weekly schedule”, it will be possible, in the right-hand table, to set the opening and closing times for each day of the week. This schedule will be applied to every week, taking no account of exceptional dates of closure.

A more accurate parameterization, taking account of exceptional dates, may be executed by selecting the “By timer” option. For greater precision, see figures 12.13 – 12.21 (pp 41-44).

Figure 13.3.1

13.4 Access control

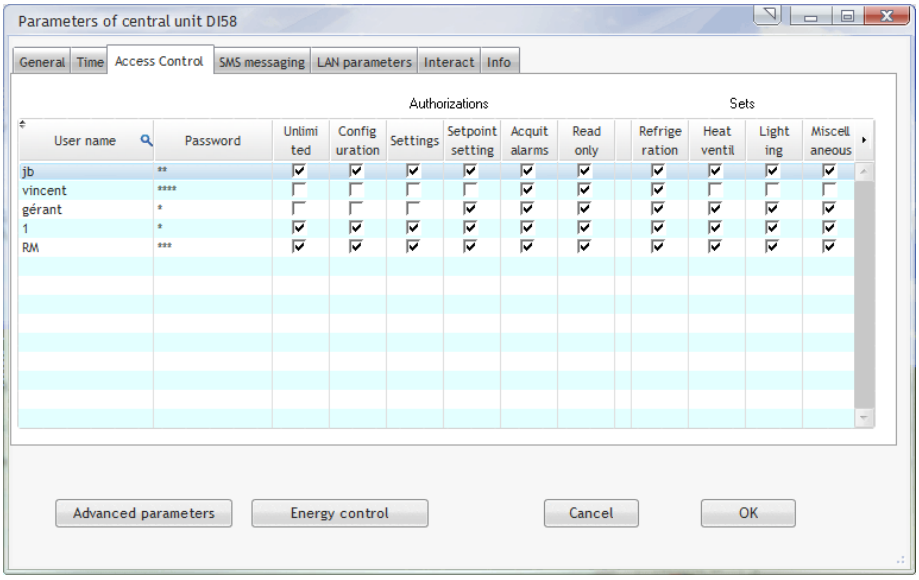
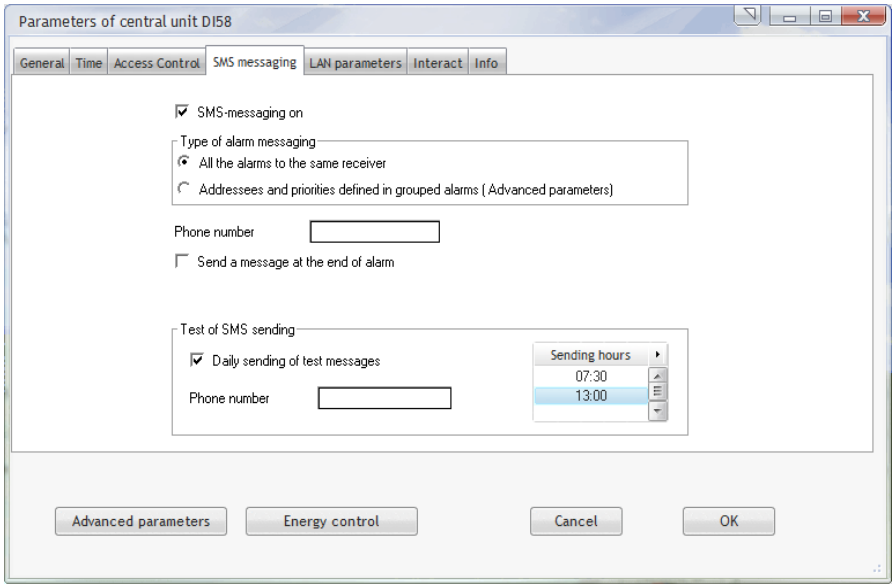


Figure 13.4.1

In the access control window, you can create rights of access for your colleagues. Simply click on a blank line and enter the name of the user, followed by their password. You will then be able to select different levels of authorization. To remove a user, simply right click on the name concerned, then click to delete.

13.5 “SMS messaging”



In this tab, it is possible to programme the automatic submission of alarms by SMS. To do this, check the box “SMS messaging activated” .

It is possible to send all SMS messages to the same recipient, or to submit each category of alarms, defined in the “Advanced parameters”/ “Combined alarms” tab, to a respective recipient, in due consideration of the priority of alarms (see chapter 13.11).

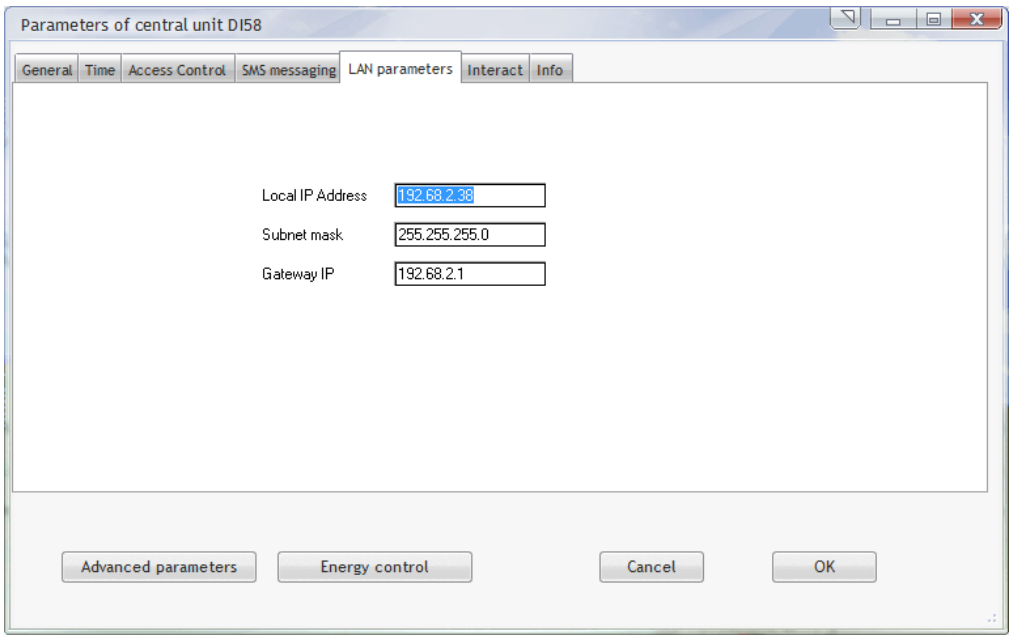
Figure 13.5.1

To receive a SMS message upon the clearance of each alarm, check the box “Send message upon alarm clearance” .

The box “Daily submission of test messages” will provide confirmation to the effect that the system is operating correctly. A number of submission times may be selected, at which you will receive a test message confirming that the SMS messaging system is operating correctly.

This function will require a GSM modem connected to the DI58 central unit. The correct operation of this function, together with the after-sales service, will only be guaranteed where modems are supplied by Digitel. The circuit arrangement for the connection of the modem to the DI58 is included at the end of the present documentation.

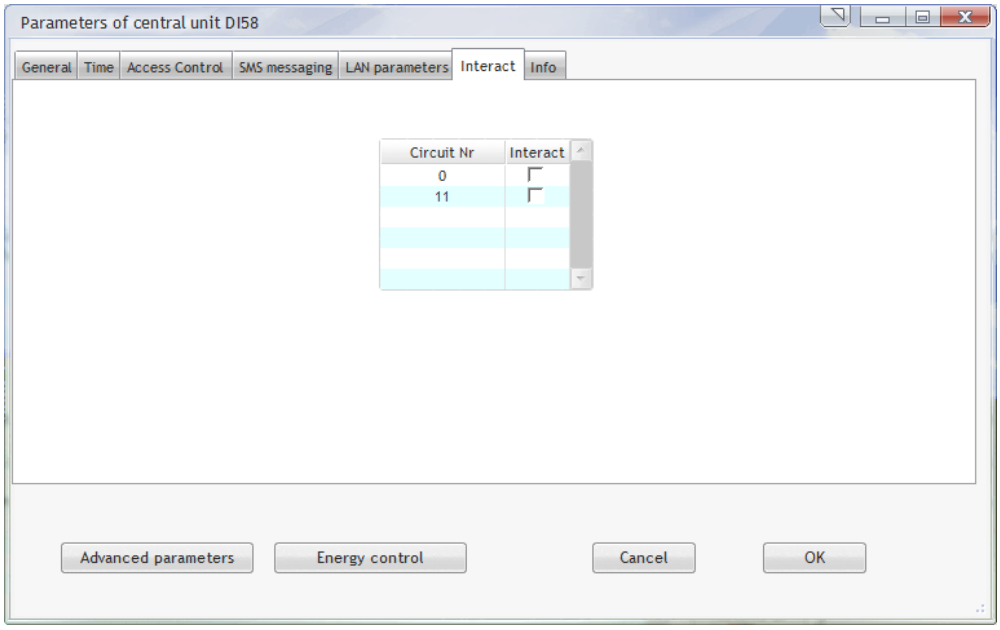
13.6 “LAN parameters”



In this tab, it is possible to modify the LAN parameters of your central unit.

Figure 0.1

13.7 “Interact”

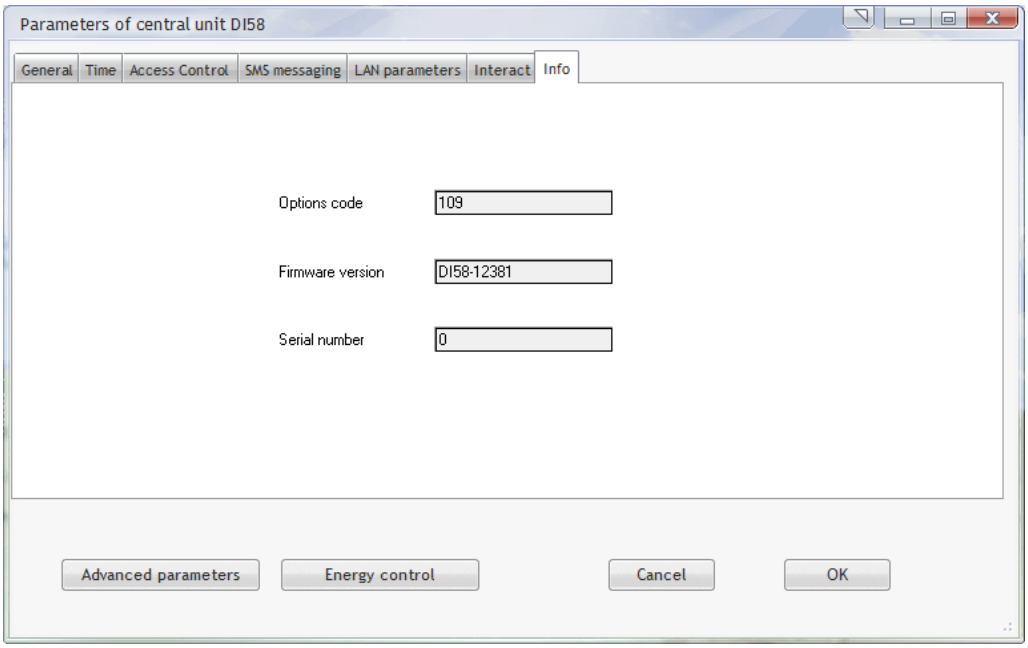


This tab may be used to activate or deactivate the “Interact” function.

This function is described in the chapter on “Management of cooling units”.

Figure 13.7.1

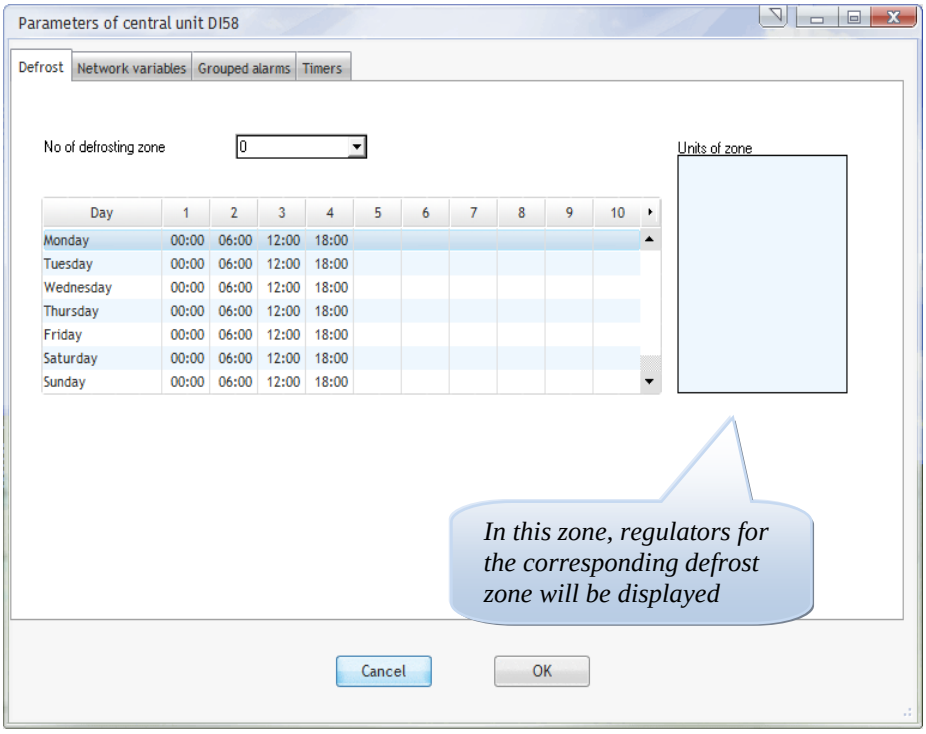
13.8 “Info”



This tab may be used to consult information on your central unit.

Figure 13.8.1

13.9 Advanced parameters



In case of the simplified management of defrost operations, where the same time schedules are repeated on every day of the week, defrost times will be programmed in the cooling unit.

If more elaborate management is required, it is possible to combine units in defrost zones. Units within the same zone will commence their defrost operations at the same time. All units will await the completion of defrosting in the final unit of the zone before resuming refrigeration.

Figure 13.9.1

A single installation may comprise up to 32 defrost zones. These are numbered from 0 to 31. For the parameterization of a zone in the window shown in Figure 13.9.1, select the number of the zone concerned, and then enter the defrosting times for every day of the week in the table. Up to 10 defrost operations per day may be programmed.

Fields corresponding to defrost operations which are not used must be left blank.

The inclusion of a unit in a given defrost zone, and its behaviour in the course of defrosting, will be programmed for the regulator in question in the “Defrost” menu.

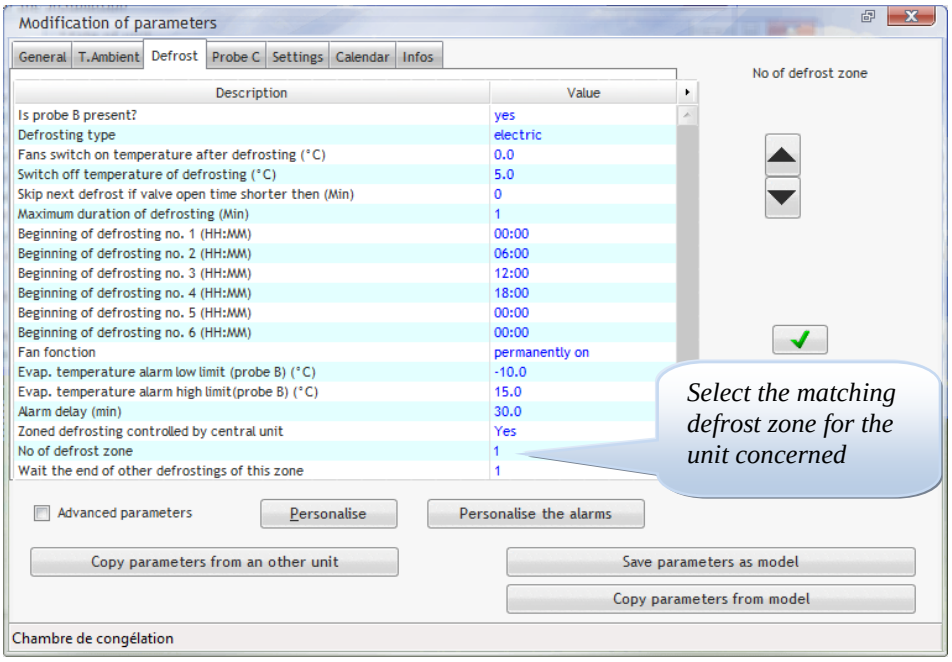


Figure 13.9.2

The defrost times programmed in regulators will be ignored in the case of operation by defrost zones. However, in case of a communication fault (bus disconnected, central unit shutdown), units will complete the defrost operations programmed in their defrost parameters (Figure 13.9.2).

13.10 “Network variables”

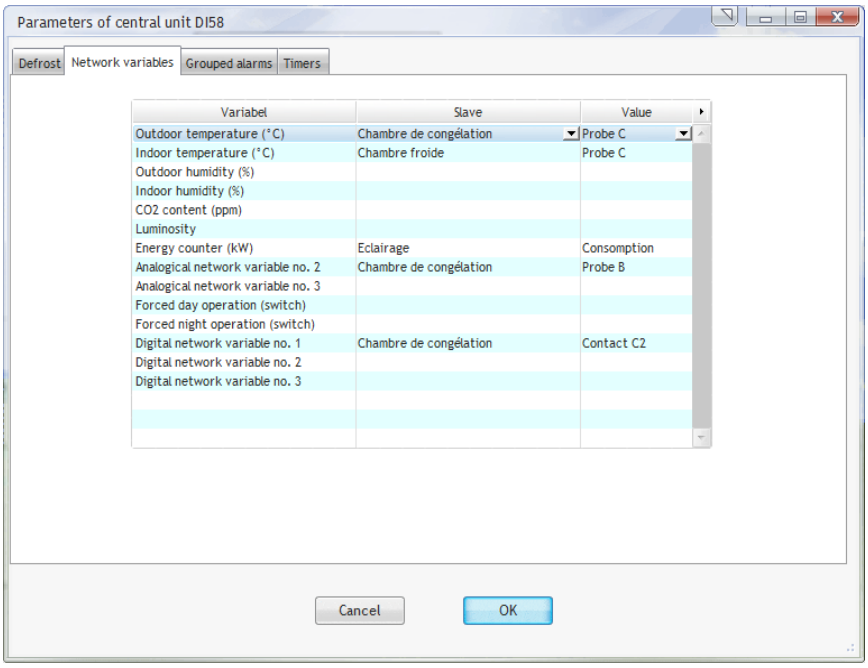


Figure 13.10.1

Using this tab, you may select a variable from the list which you wish to communicate to all regulators on the installation. This function, as shown in the example, can be used to communicate the exterior temperature to all regulators – this variable can then be used to modify the operation of the unit concerned.

For example: the parameter “Luminosity” is a network variable. A number of regulators are responsible for the actuation of lighting. These modules, in accordance with the “Luminosity” variable which is notified to all regulators, can adapt their lighting command function.

13.11 “Grouped alarms”

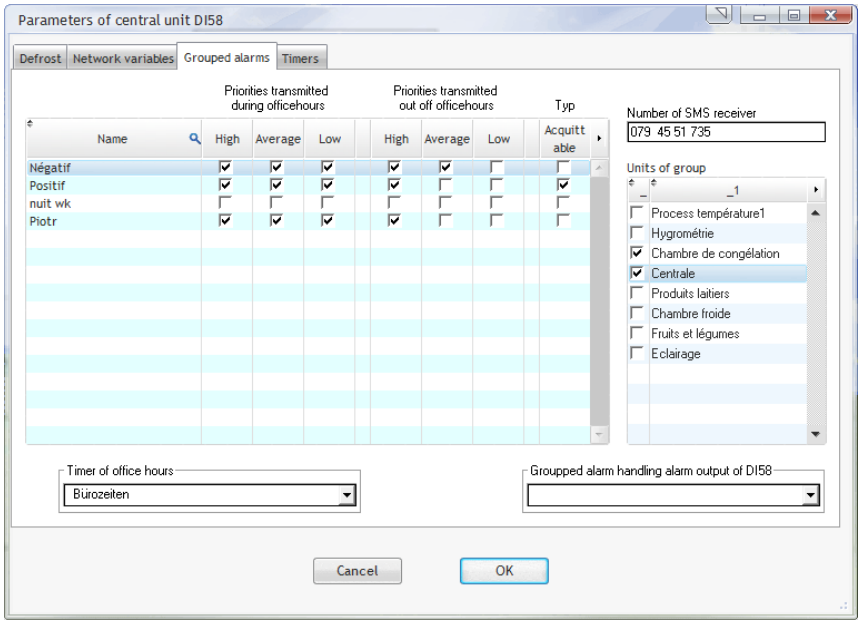


Figure 13.11.1

In order to avoid any excess workload for the standby service and optimize the management of alarms, the processing of alarms may be differentiated according to time, the unit concerned and the importance of the alarm. To this end, it is possible to create groups of units and assign specific alarm processing functions to these groups.
The procedure to be applied is as follows:

1. Create a timer which will specify office opening hours, in accordance with the procedure described in chapter 13.12. Periods outside these times will be classified as standby hours.
2. Under “Office hours timer” in the “Grouped alarms” tab, select the timer created.
3. Create a group of alarms by entering its name in the “Designation” column.

a. Select the constituent units of this group by checking the boxes in front of their respective names in the table “Associated units” on the right-hand side of the window.
b. In the columns for “Priorities notified during office hours”, check the priorities required. In the group concerned, alarms with an unchecked priority will be ignored during office opening hours.
c. Also check the priorities required in the columns “Priorities notified during standby hours”. Only alarms with a checked priority will be processed during standby hours. Other alarms will be ignored during these periods.
d. If alarms in the group concerned are to be transmitted by SMS, enter the number under “Number of SMS recipient”. If not, this field should be left blank.

4. Repeat stage 3 to create all the alarm groups required.

A maximum of 32 alarm groups may be created. A single unit may be included in one or more groups. Likewise, the unit concerned may not be included in any group.

Alarm priorities will be defined for each unit in accordance with the procedure described in chapter 9.1 “Customization of alarms”.

The above description relates to the transmission of alarms by SMS and the signaling of alarms by combined alarm contacts. The reception of alarms by monitoring PCs using TelesWin is described in chapter 12 “Alarms”.

The group concerned may control a module output which is programmed in “Input-Output” mode. An example of this function is set out below.

Go to unit parameters in “Input-Output” mode, and then click on one of the output contacts.

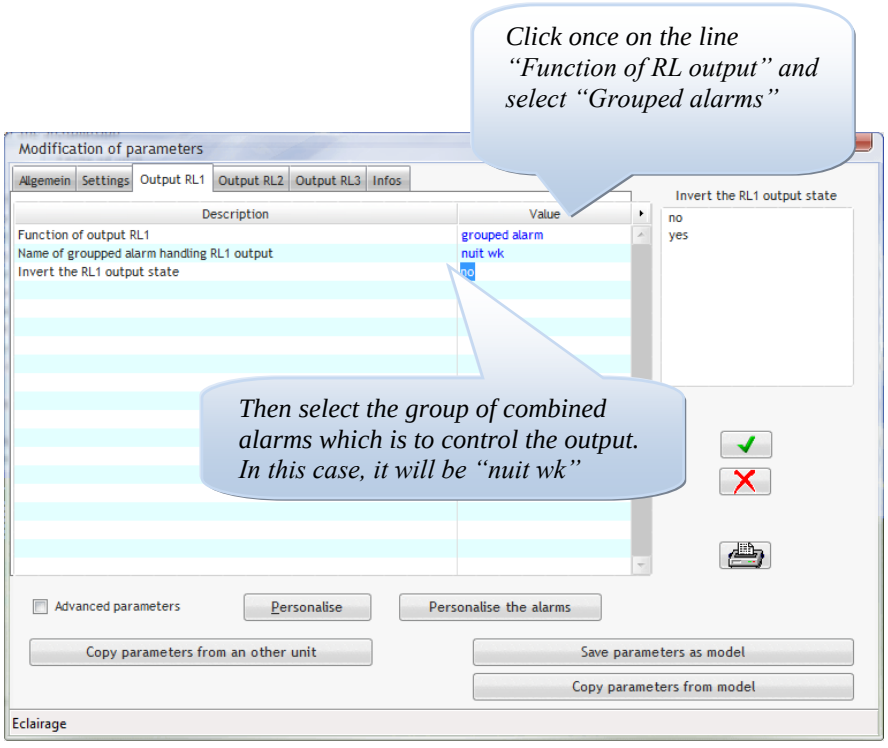


Figure 13.11.2

The RL1 output contact will function as follows:

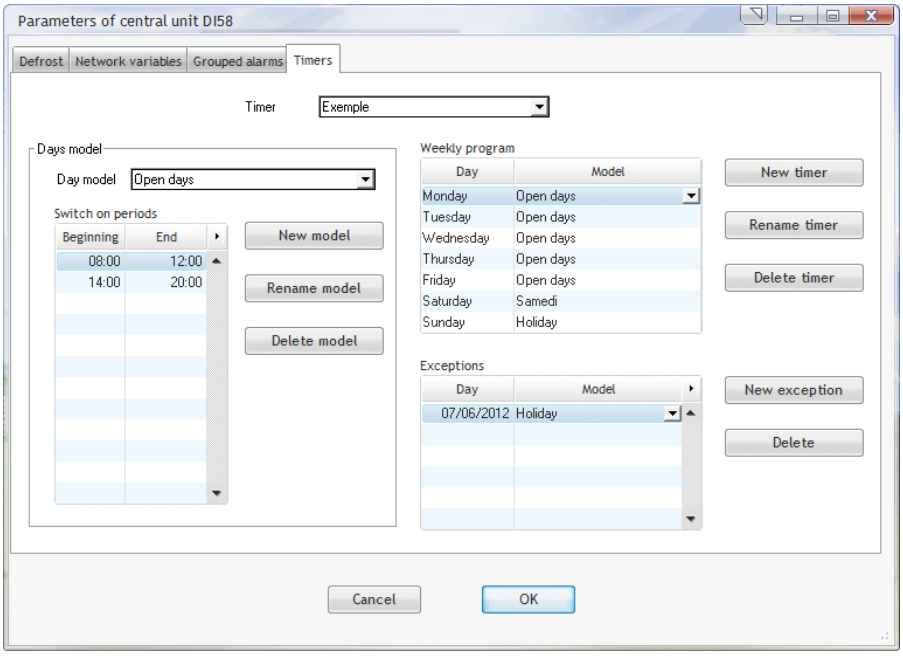
While no alarm from the group corresponding to “nuit wk” is signaled, the contact will remain open. In case of an alarm, the contact will close.

In general, it is advised that this mode of operation should be reversed by activating the status inversion of the RL1 output using the last parameter in the list.

In the same way, it will be possible to parameterize the other 2 outputs on the module to signal alarms on other groups.

All alarm information will be routed via the communication bus. Outputs programmed for the “combined alarm” function will automatically switch over to alarm status where the corresponding regulator receives no information from the bus for a period exceeding 15 minutes. This may occur in case of the shutdown of the central unit or the disconnection of the bus.

13.12 “Timer”



Our system will permit the creation of up to 128 timers, which may used for the management of store opening and closing times, the control of lighting, heating, etc..

To create a new timer, click on “New timer”.

Figure 13.12.1

In the window which will then open, enter the name of your timer.

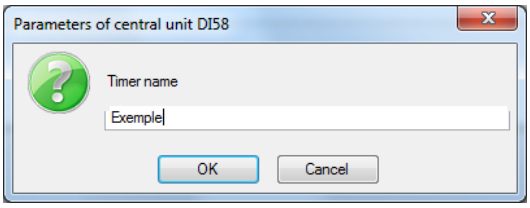


Figure 13.12.2

Click on “OK” to confirm.

It will then be necessary to create models for daily operation which will be applicable on different days of the week. For example, there may be one operating model for working days, another for Saturdays and a third for public holidays. These models will be associated with the timer which is currently in the course of creation. Each timer will be associated with its own models (up to a maximum of 128). To create a model, click on “New model” .

Enter the name of the model (in our example: “Monday – Friday”).

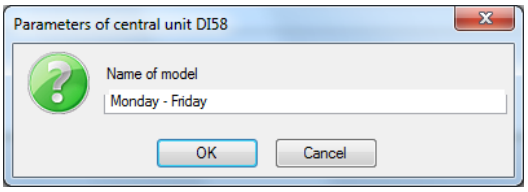
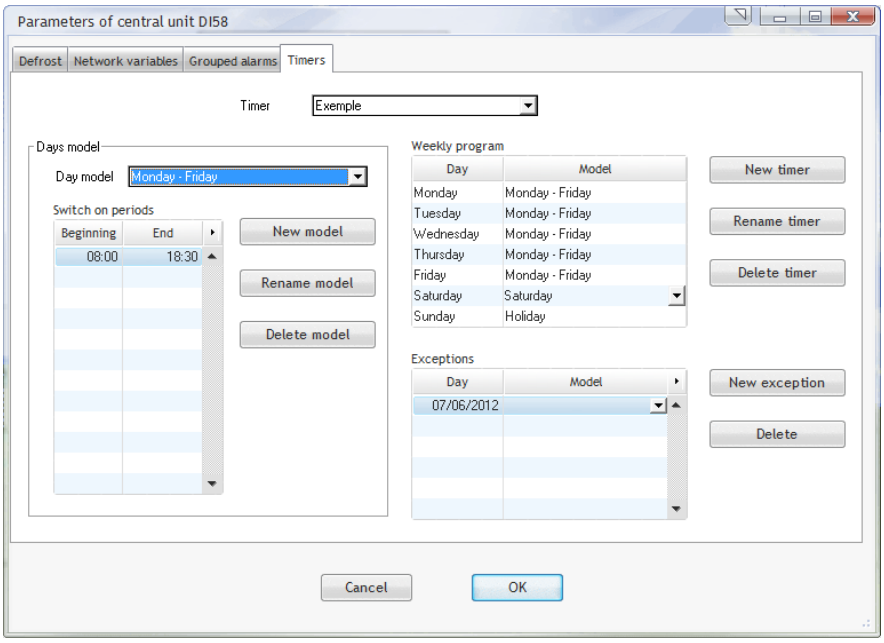


Figure 13.12.3

Click on “OK”

In the new model, it will now be necessary to enter the periods of time during which the timer will be active (start and finish times in the table “Operating periods”. A maximum of 4 periods may be programmed per model.



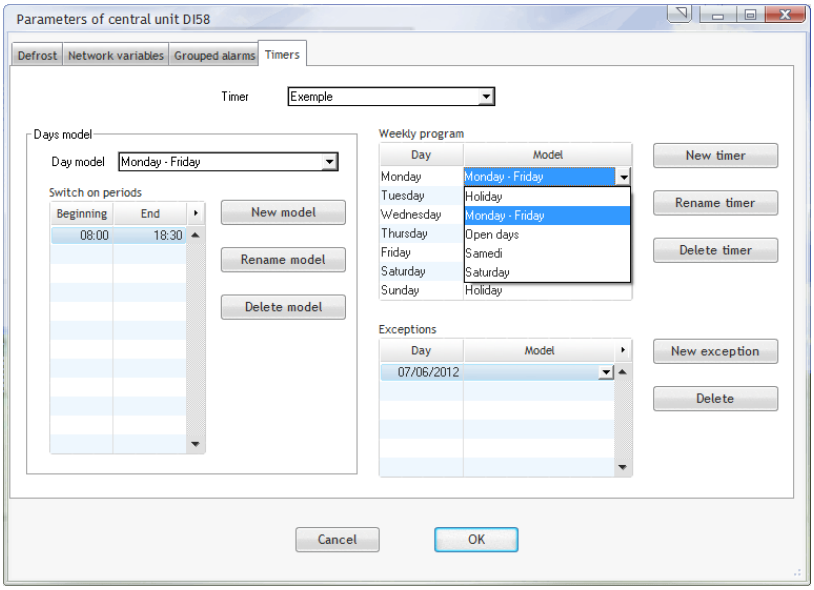
In this example, we will create two further models:

- A “Saturday” model
- A “public holidays” model

On days where the timer is to remain deactivated for the entire day, the fields provided for times should be left blank.

Figure 13.12.4

Once all the models are complete, a model must be assigned to each day of the week. To do this, click on the line “Monday” in the box “Weekly schedule” and select a model for Mondays.



Select “Monday – Friday” to programme Mondays.

Apply the same procedure to programme the remaining days of the week.

Figure 13.12.5

Once this task is complete, the screen will look like this:

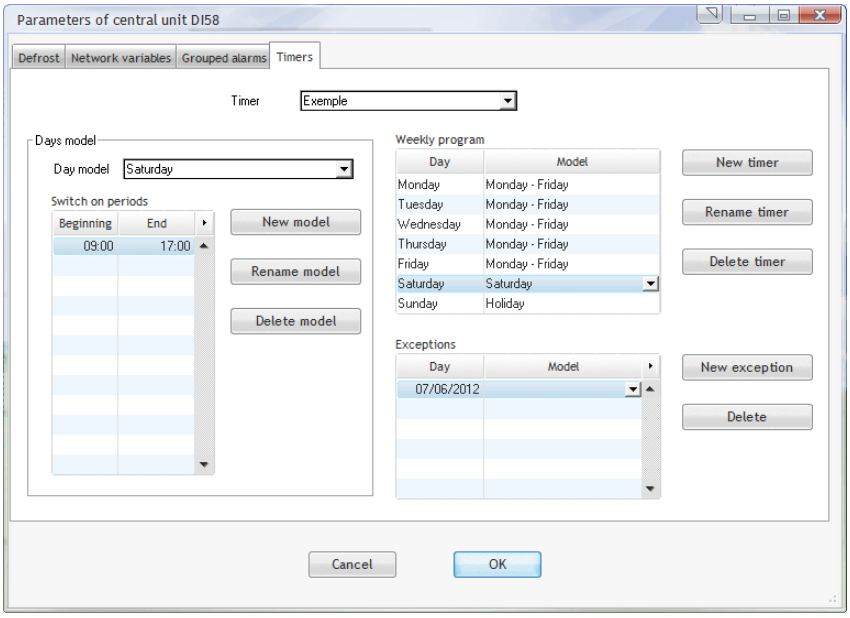


Figure 13.12.6

We will now consider exceptional cases. These involve days upon which operation will deviate from the rules entered in the weekly schedule (e.g. a public holiday which falls on a Monday). To create a new exception, click on the button “New exception”.

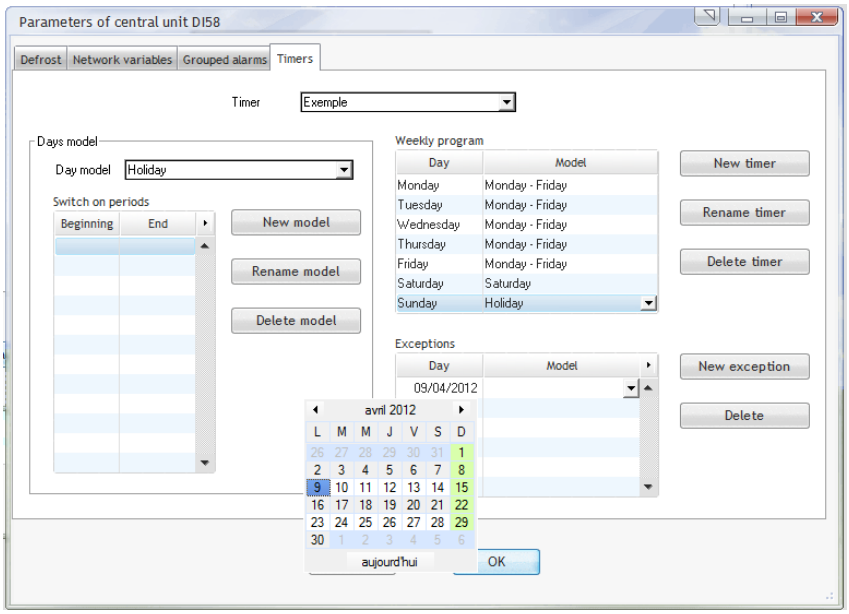


Figure 13.12.7

Select the day upon which the timer is to operate in an unusual manner.

In this example, we will use Easter Monday 2012, i.e. 9th April 2012.

Select the date from the calendar and select the operating model which is to apply on the day concerned.

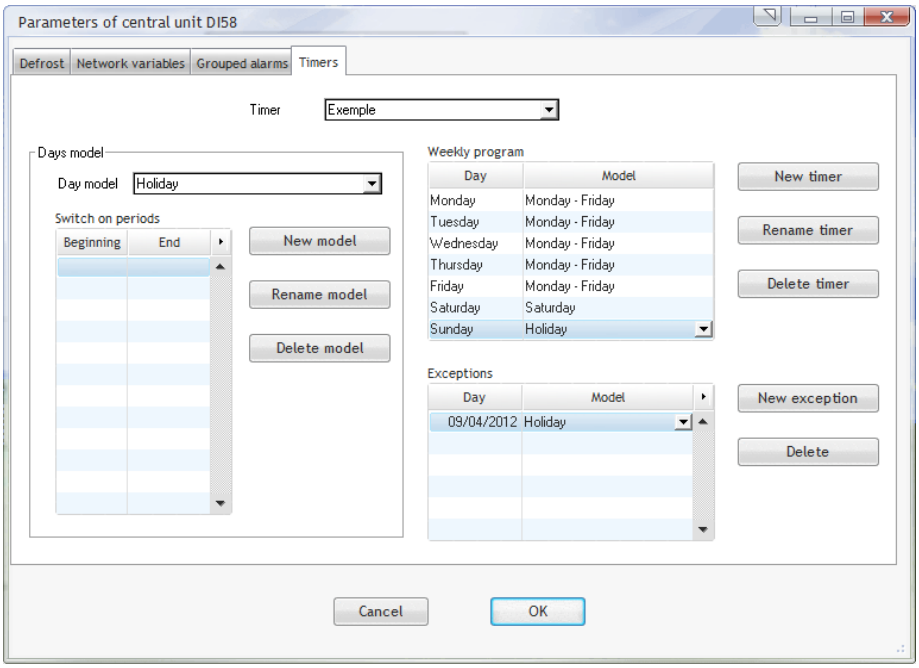


Figure 13.12.8

Accordingly, Easter Monday will be classified as a public holiday.

Using this method, it will be possible to programme every exceptional day for the next 20 years.

Click on “OK” to save the programmed timer settings.

Finally, to activate the timer, exit the window by clicking on “OK”.

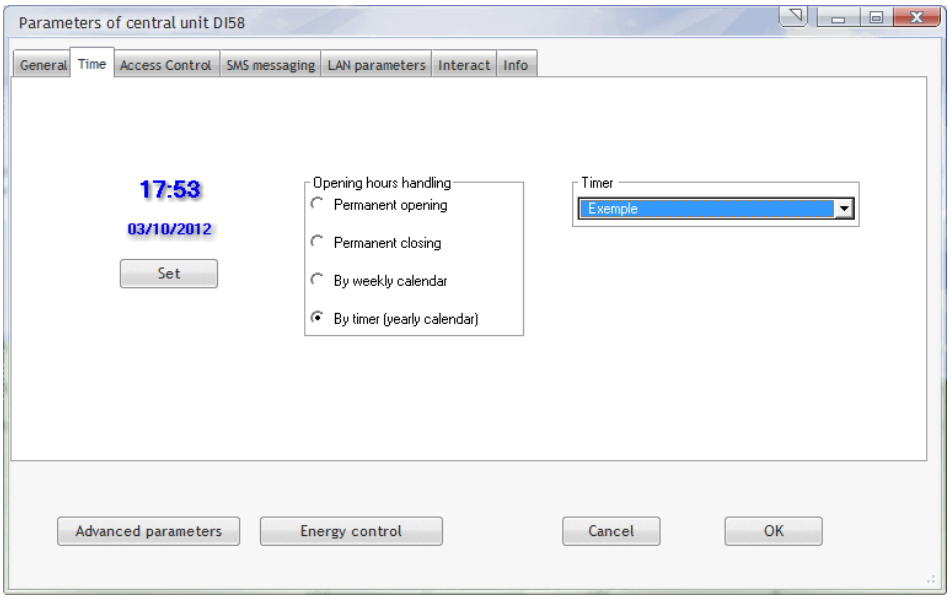
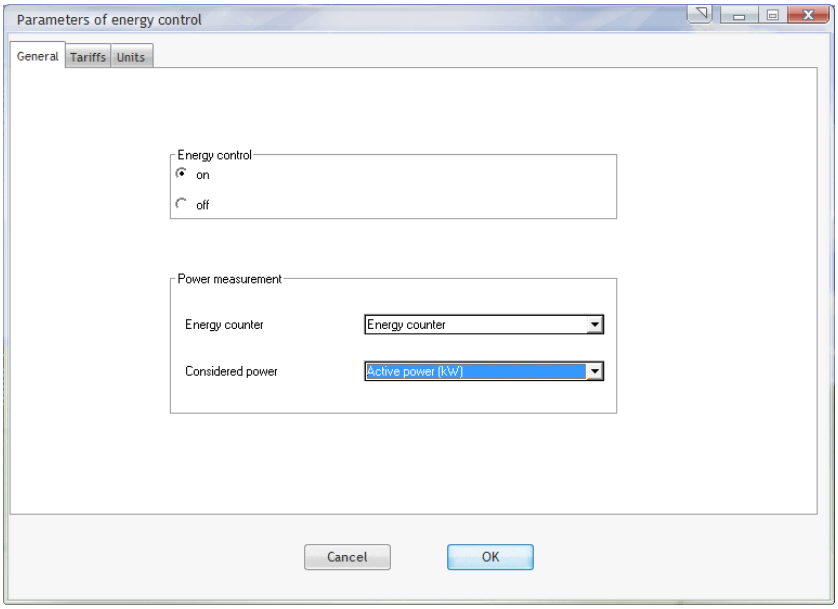


Figure 13.12.9

Once in the parameters window for the central unit, select the timer concerned to complete the operation.

13.13 Energy management

Energy use may be managed by clicking on the button “Energy management”. This will open the following window.

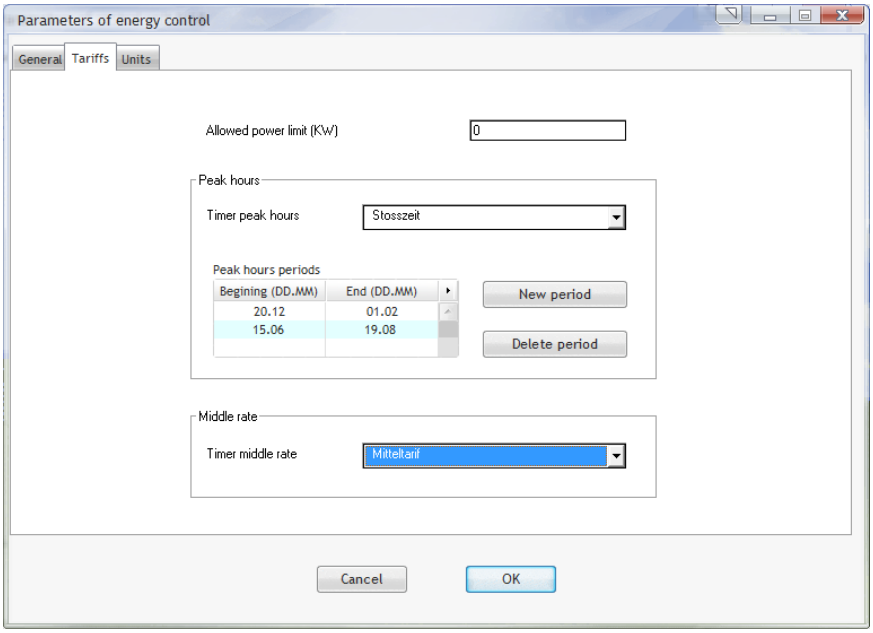


The energy management function is activated by selecting “on”.

Select the meter provided for energy management from the scroll-down menu “Energy meter” [“Compteur d’énergie”], then select the power variable to be considered (you may choose between “Active power [kW]” and “Apparent power [kVA]”.

Figure 13.13.1

The “Tariffs” tab will open the following window:



This tab may be used to define the maximum limit on consumption, in kW.

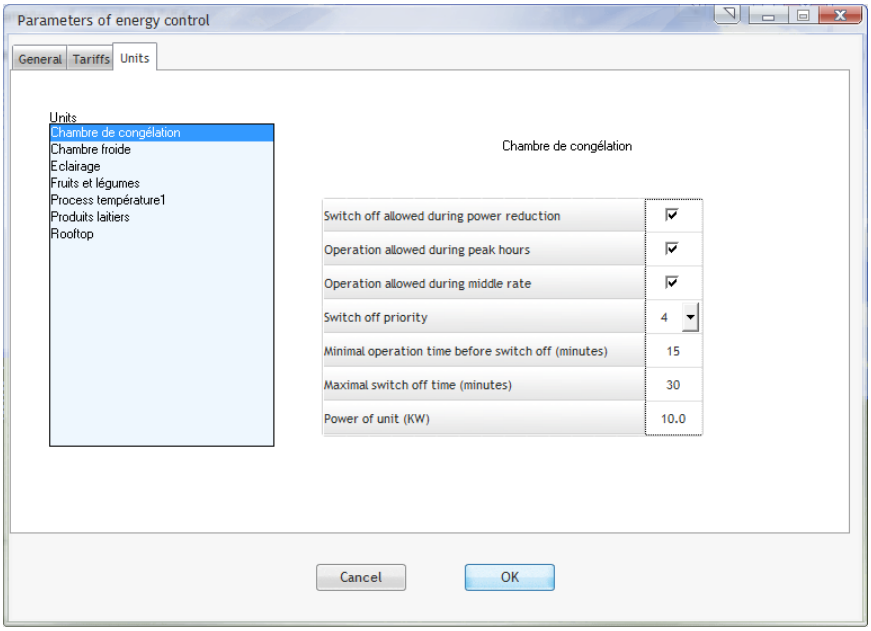
During peak hours, when the energy tariff is high, select a timer to define the peak hours for each day of the week. Then enter the periods during which peak hours will be in force.

During standard hours, when the energy tariff is moderate, it will be necessary to select a second timer, which will be selected from the “Standard hours timer” list.

Figure 13.13.2

The remaining hours will be classified as off-peak hours.

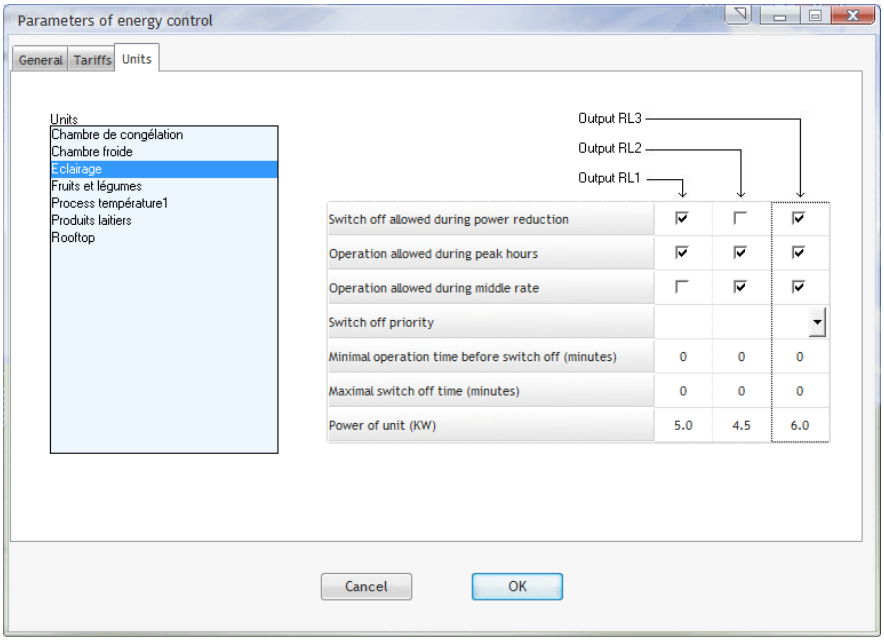
The third tab, “Units”, will open the following window:



In case of excessive consumption, the system will shed certain units in order to reduce consumption. The selection of consuming devices which are to be shutdown will be based upon the parameters associated with these devices which are entered in this window, for each unit considered separately. Priority and authorization for load shedding, the capacity of the unit concerned and other criteria will allow the system to apply an intelligent selection for the reduction of consumption without disturbing the operation of the installation.

Figure 13.13.3

Regulators in operating mode 3 “Inputs-Outputs” can control up to 3 energy consuming devices.



Accordingly, criteria for each consuming device must be selected separately.

Figure 13.13.4

14. Use of timers and network variables

14.1 Use of timers and network variables

The outputs of DI24 modules programmed in mode 3, “Inputs-Outputs”, may be controlled by timers and/or by network variables. For the configuration of these outputs, call up the corresponding unit and open the parameterization window. Click on the table “RL1 output”. The first parameter will allow the selection of the function which is to be assigned to the corresponding contact. By selecting “open” or “closed”, the corresponding contact will be maintained in the open or closed position respectively.

Where “timer” is selected, the list of parameters will appear as follows:

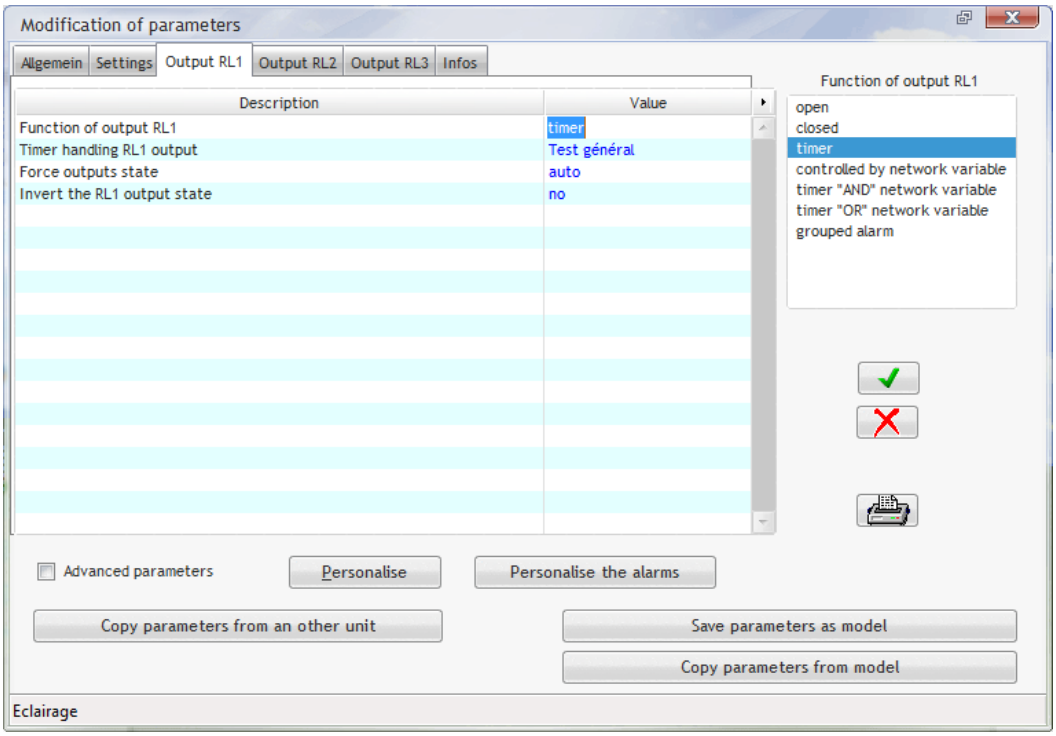


Figure 14.1.1

The following parameter will allow the selection of the timer which is to control the RL1 output. The RL1 output contact will close during those periods where the selected timer is activated, and will open outside the active periods of that timer.

By selecting “controlled by network variable” for the parameter “Function of RL1 output” in the entry window for parameters, the following list of parameters will appear:

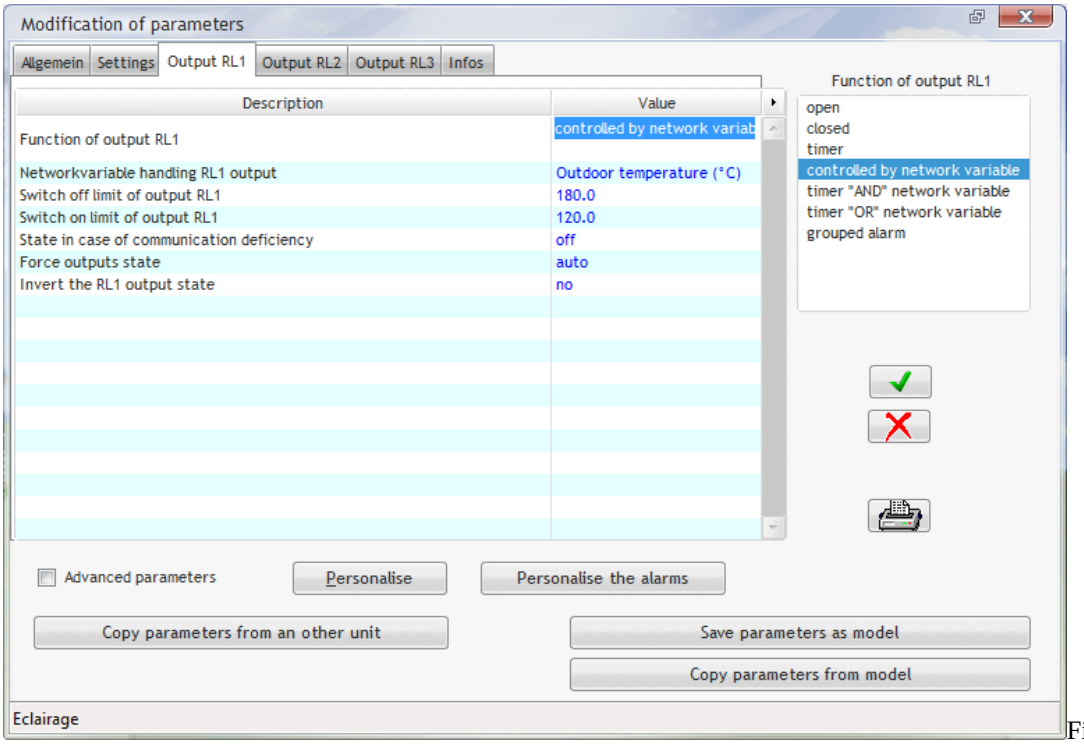


Figure 14.1.2

The second parameter may be used for the selection of the network variable which is to control the RL1 output. Parameters 3 and 4 define the limiting values for the variable which will trigger the closure or opening of the RL1 contact. The output contact will remain unchanged, provided that the value of this variable lies within the neutral zone defined by the “Deactivation limit for RL1 output” and the “Activation limit for RL1 output”. Where this variable achieves the “Deactivation limit for RL1 output”, the contact will open, and where it achieves the “Activation limit for RL1 output”, it will close. In other words, the output will function as a heating thermostat, for which the activation limit is lower than the deactivation limit. In the opposite case, the contact will function as a refrigeration thermostat.

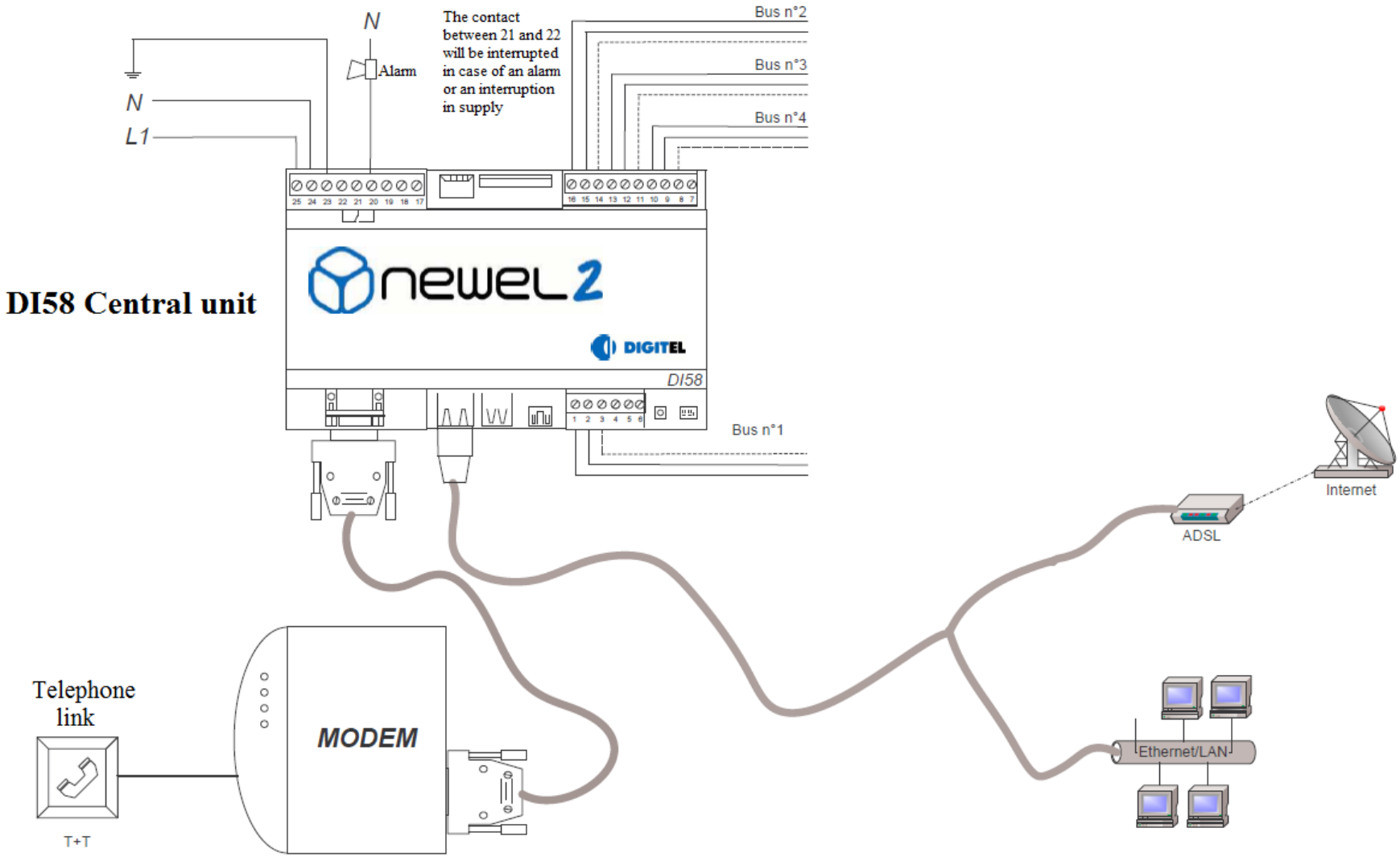
It should be noted that the reliability of control by network variables will depend upon the correct operation of communications on the bus. The parameter “Status in case of a communication fault” will permit the override of an output for the assumption of a particular status, in case of a communication outage (disconnection of the bus, shutdown of the central unit, etc.). The contact will switch over to this status in the absence of communication with the module concerned for a period of 15 minutes.

For both command options (by timer and by variable), the behaviour of the contact described above will be reversed where the parameter “Status inversion of RL1 output” is programmed to “yes”.

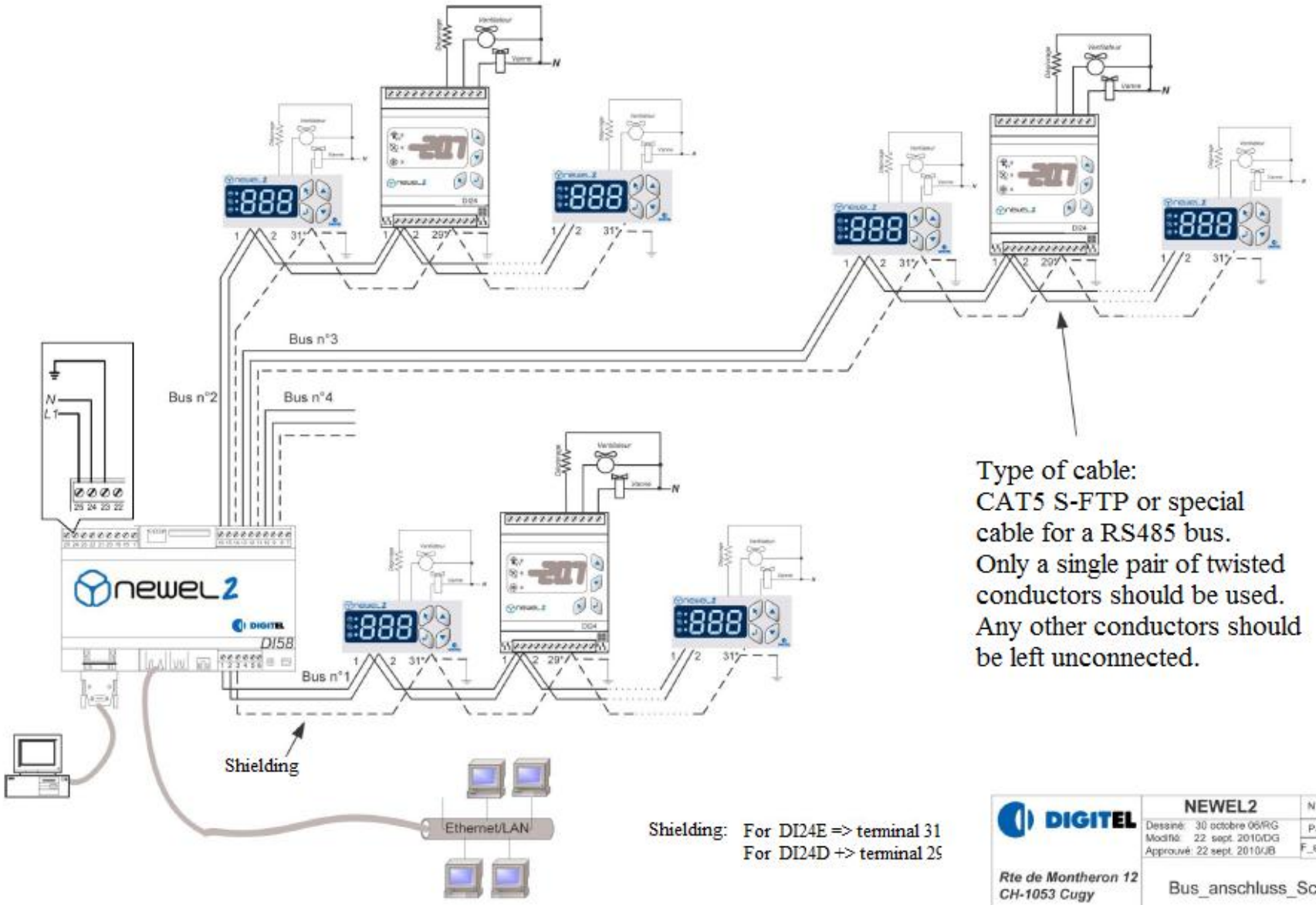
The mode of operation described above will apply where the parameter “Override output status” is programmed to “auto”. By programming this parameter to “activated” or “deactivated”, it will be possible to temporarily override the respective status, taking no account of the timer or network variable concerned.

The parameter “Function of RL1 output” will also provide the option for the control of the output using the logic functions “AND” and “OR” between a timer and a network variable. This represents a combination of the two functions described above, and will permit the more advanced control of certain devices. For example, the start-up of heating may be restricted to office opening hours programmed in an “AND” timer, only where the exterior temperature falls below a programmable limit.

This paragraph describes the programming of the RL1 output. The configuration of functions on the RL2 and RL3 outputs may be undertaken in the same way.



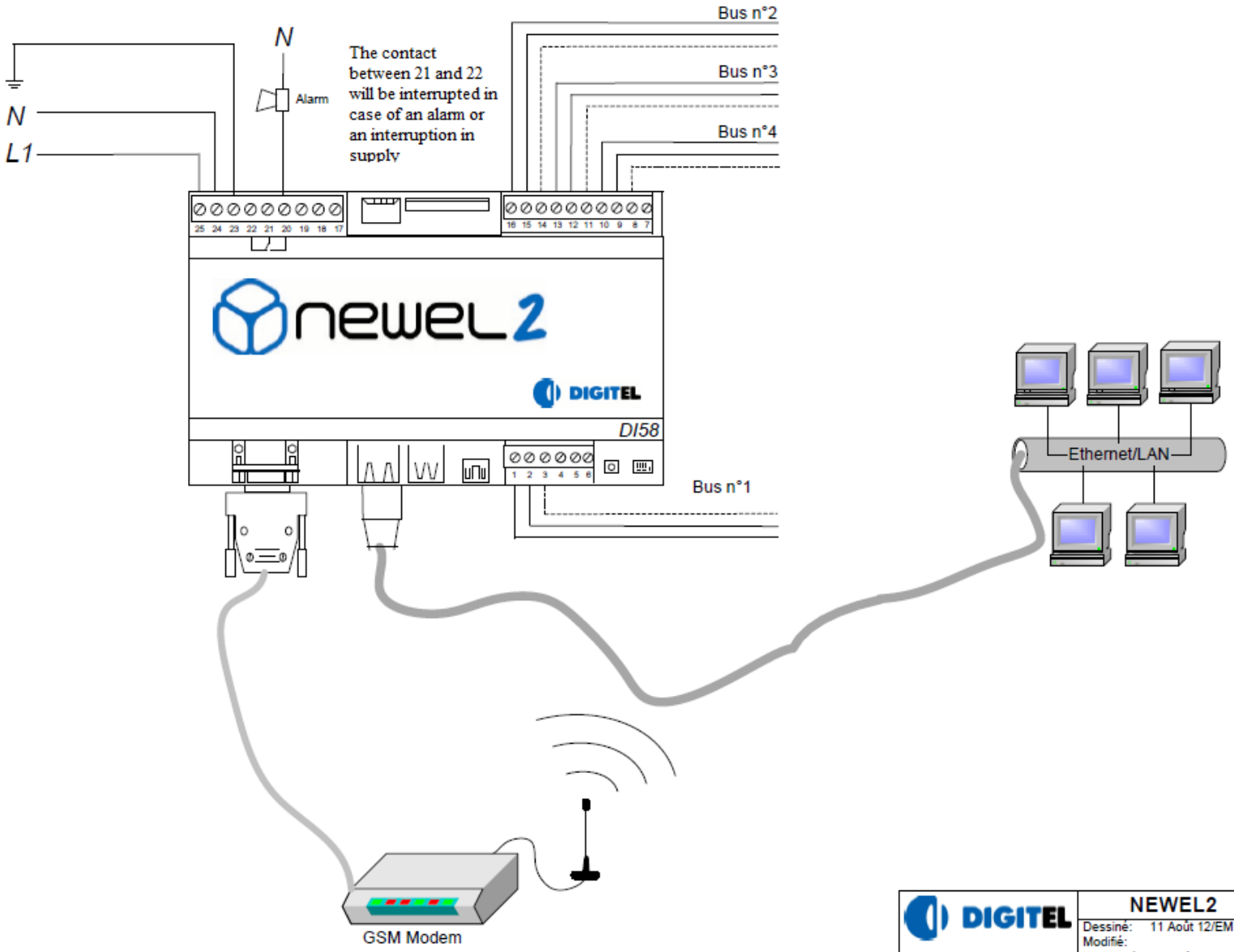
DIGITEL *Rte de Montheron 12* *CH-1053 Cugy*	NEWEL2	N° DI58.48.01
	Dessiné: 05-Fev-04/FN Modifié le: 24-sept-10/DG Approuvé le: 24-sept-10/JB	Page 1/1 Raccordement du modem DI58.vsd
	Netzwek und Modem Anschluss	



Type of cable:
CAT5 S-FTP or special cable for a RS485 bus.
Only a single pair of twisted conductors should be used.
Any other conductors should be left unconnected.

Shielding: For DI24E => terminal 31
For DI24D +> terminal 29

DIGITEL	NEWEL2	N° DI58.48.05
	Dessiné: 30 octobre 06/RG Modifié: 22 sept. 2010/DG Approuvé: 22 sept. 2010/JB	Page 1/1 F_schemabus.vsd
Rte de Montheron 12 CH-1053 Cugy	Bus_anschluss_Schema	



DIGITEL *Rte de Montheron 12* *CH-1053 Cugy*	NEWEL2 Dessiné: 11 Août 12/EM Modifié: Approuvé: 11 Août 12/JB	N° DI58.48.03 Page 1/1 d_messagerie sms.vsd
GSM Modem Anschluss mit DI58, für SMS-Benachrichtigung		