NEWEL 3

USER MANUAL

MANAGEMENT OF COMPRESSORS AND CONDENSERS

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5. MANAGEMENT OF COMPRESSORS AND CONDENSERS

5.1. INTRODUCTION

It is assumed that the reader of this document will previously have read the chapter **1 Introduction to NEWEL3** The latter describes all the basic concepts which are essential to an understanding of the present document, and of the concept of the NEWEL3 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.

5.2. GENERAL DESCRIPTION, BASIC CONNECTIONS

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

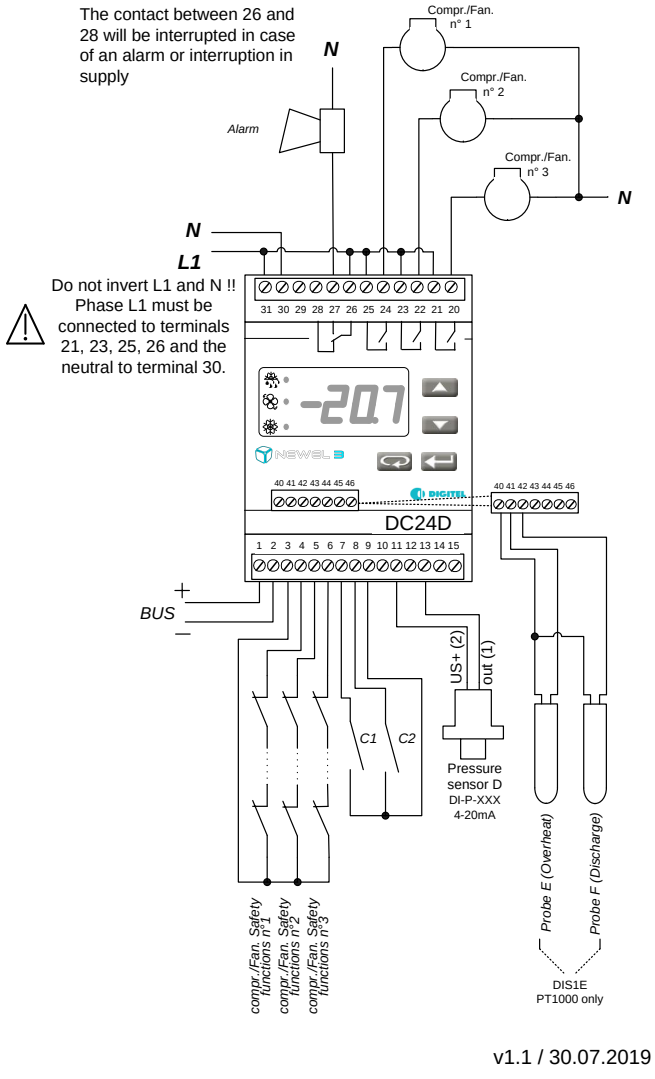


Figure 5.2.1

Satellite units will have the capability for the management of compressor plants (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 compressor plants (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).

By adding the temperature probe E it is possible to monitor the overheat by the fluid return. Under a programmable setpoint an alarm will start. The setpoint and the alarm delay are programmable with the software TelesWin.

This way, the temperature probe F can monitor the discharge temperature and start an alarm if the programmed setpoint is exceeded.

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 **5.9**).

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 like in the following figure by connecting the Local BUS on plug 14 and 15. The main module is called “master” and the extension modules are called “slaves”.

Each module has his own address. It must be entered in the parameter **[CF1]** in the main configuration.

The pressure sensor is connected to the master unit only. Likewise, only contacts C1 and C2 on the master unit will be operational.

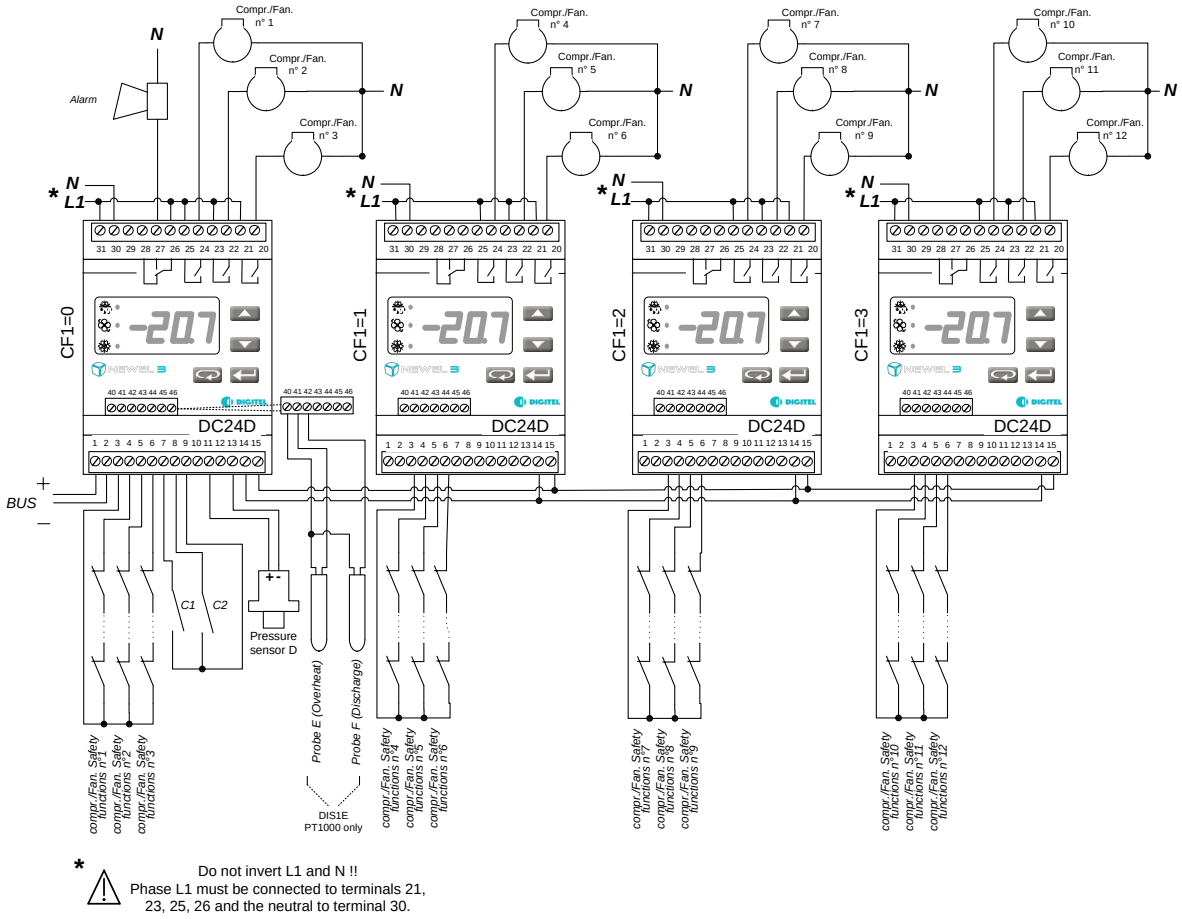


Figure 5.2.2

5.3. PRINCIPLES OF REGULATION

Conversely to conventional regulation systems, the regulation function in the NEWEL3 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

5.3.1. 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. **Figure 5.3.1** shows an example of a condenser regulation function, in which 1 fan is regulated and the remaining fans are operating in “on-off” mode.

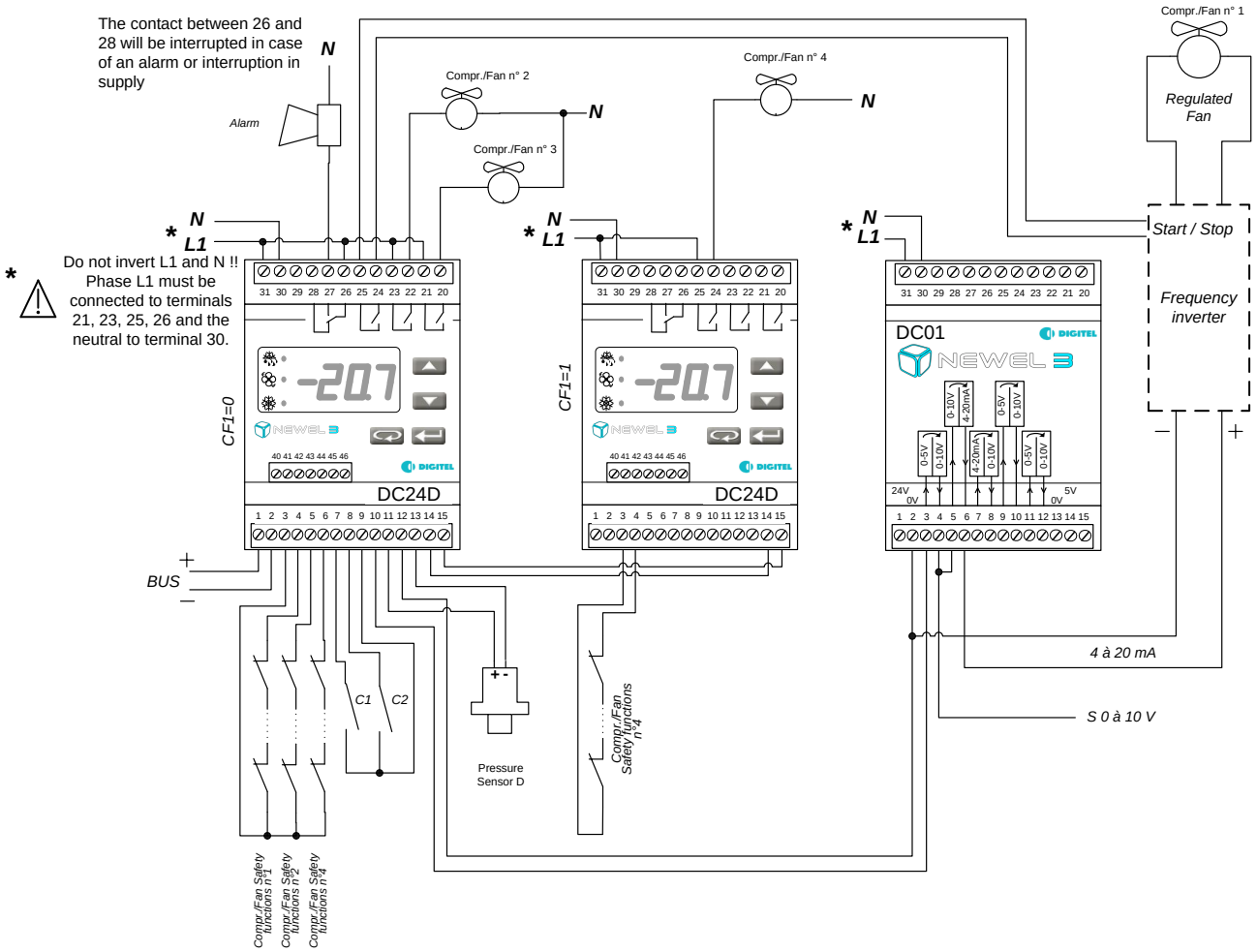


Figure 5.3.1

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 5.3.2** 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)

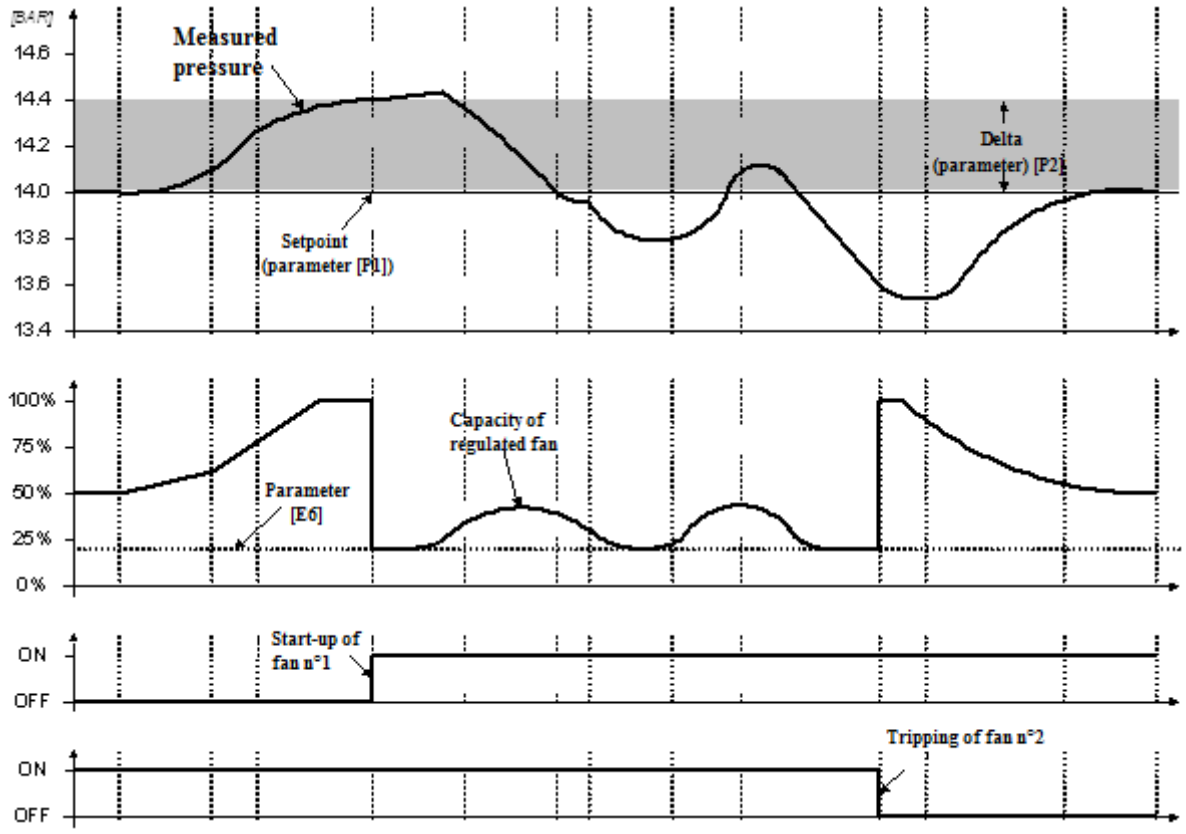


Figure 5.3.2

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" = 30, "P11" = 30, "P12" = 30).

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)
[P10] Integration coefficient (Regulation Menu)
[P11] Differential coefficient (Regulation Menu)
[P12] Proportional 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.

5.3.2. 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.

5.3.3. 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.

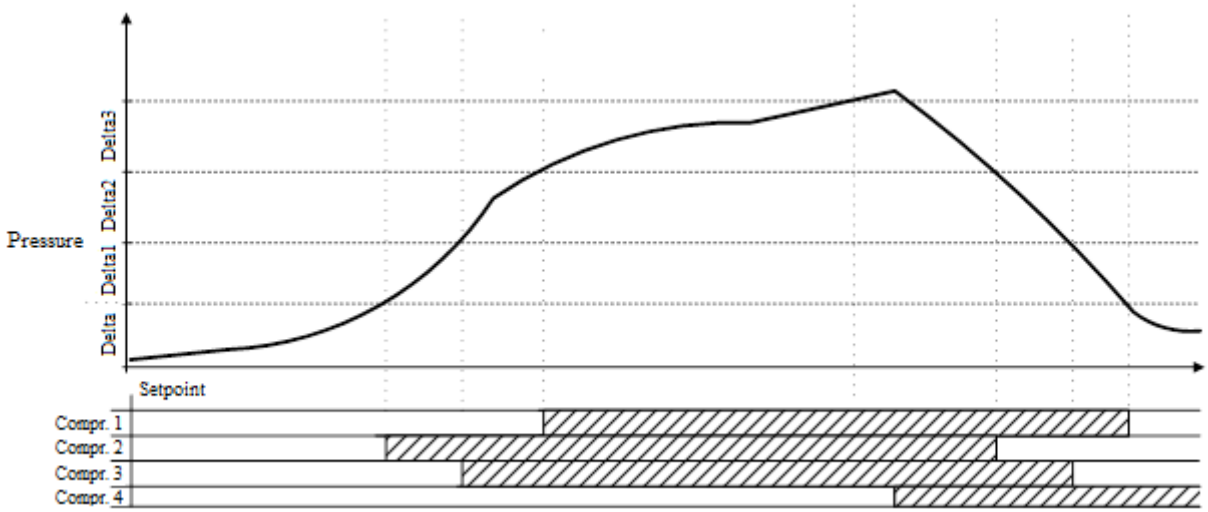


Figure 5.3.3

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

The NEWEL3 regulation function is capable of managing 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 bypassesfor 2 pressure levels (1 bypass).

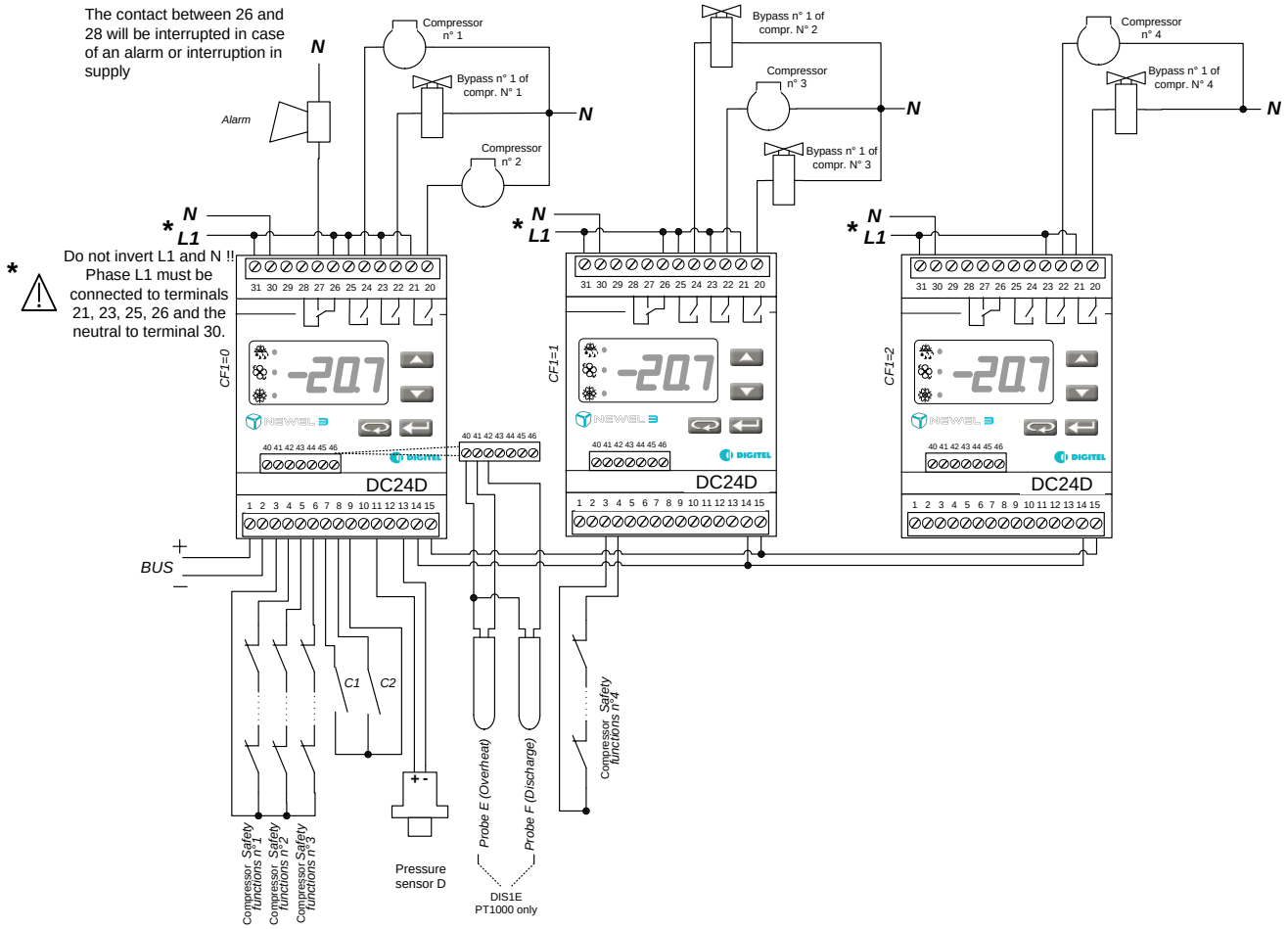


Figure 5.3.4

Figure 5.3.5 describes the assignment of outputs for motors and reduction bypasses associated with various numbers of capacity stages.

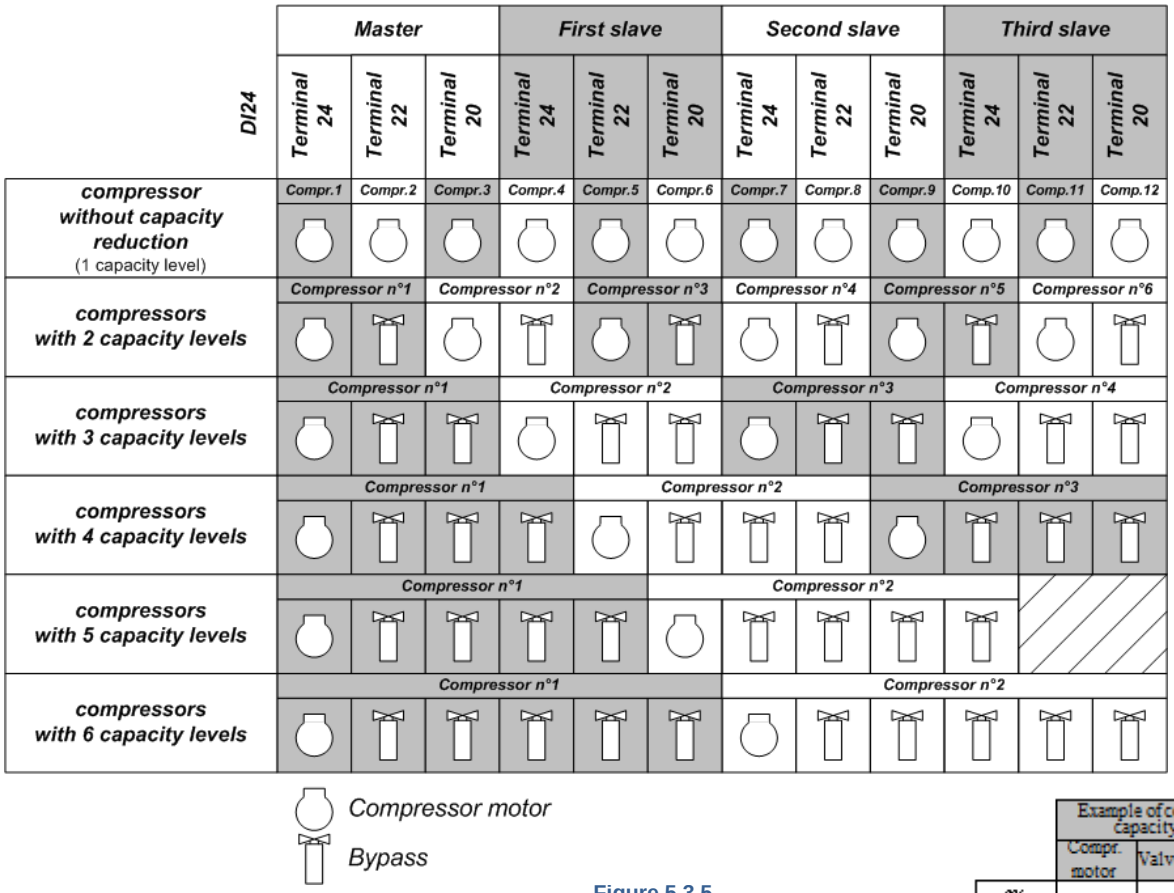


Figure 5.3.5

	Example of control for 3 capacity levels		
	Compr. motor	Valve n°1	Valve n°2
0%			
33%			
66%			
100%			

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.

5.3.5. 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 plant 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

Total capacity	0kW	1.5kW	3.0kW	4.5kW	6.0kW	7.5kW	9.0kW
Compressor n°1 (1.5kW)	OFF	ON	OFF	ON	ON	OFF	ON
Compressor n°2 (3.0kW)	OFF	OFF	ON	ON	OFF	ON	ON
Compressor n°3 (4.5kW)	OFF	OFF	OFF	OFF	ON	ON	ON

With parameter **[L7]** programmed to 1, the NEWEL3 module can be adapted to this type of plant. 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.

[L7] Type of central unit (Configuration Menu)

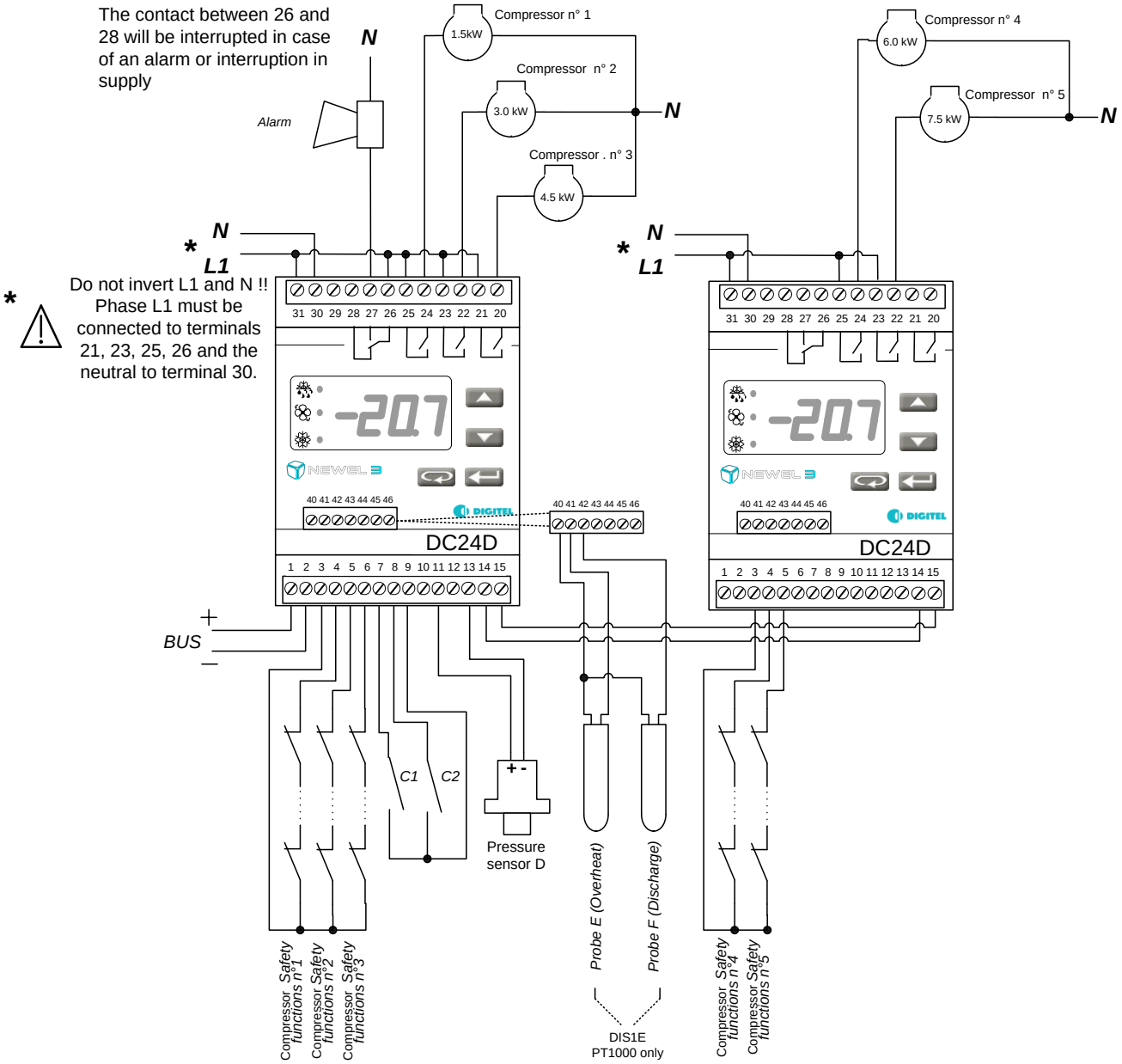


Figure 5.3.6

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..

[P8]Time delay for capacity increase (Regulation Menu)
[P9]Time delay for capacity decrease (Regulation Menu)

5.3.6. CONDENSERS WITH MULTIPLE REFREGERAION 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 5.3.7).** In consequence, the condenser will be controlled by the circuit with the highest pressure.

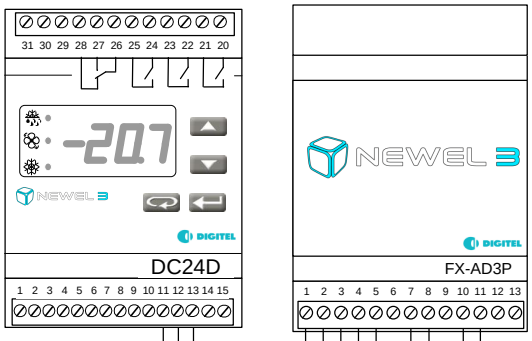


Figure 5.3.7

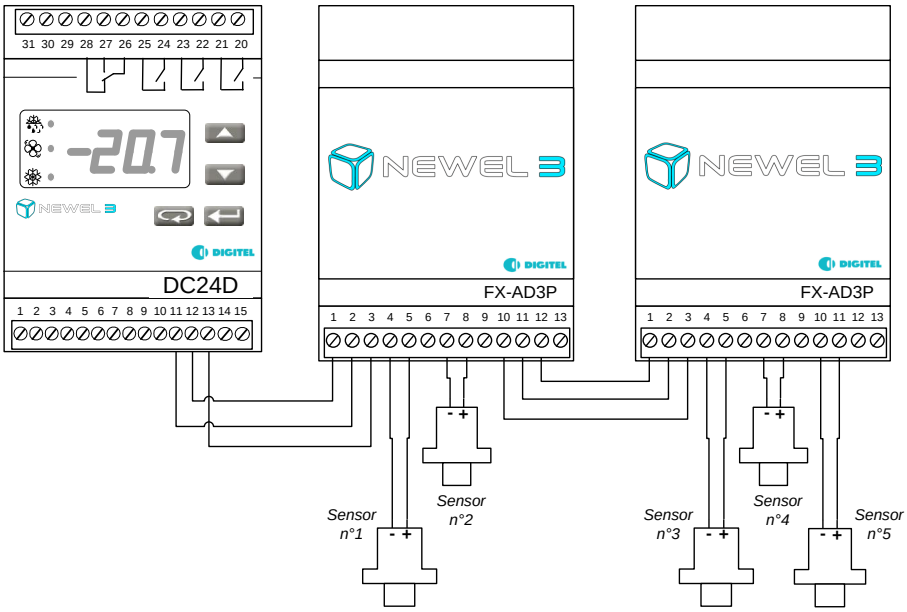


Figure 5.3.8

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 5.3.8**).

5.3.7. CHILLED WATER UNITS. REGULATION USING A TEMPARATURE 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.

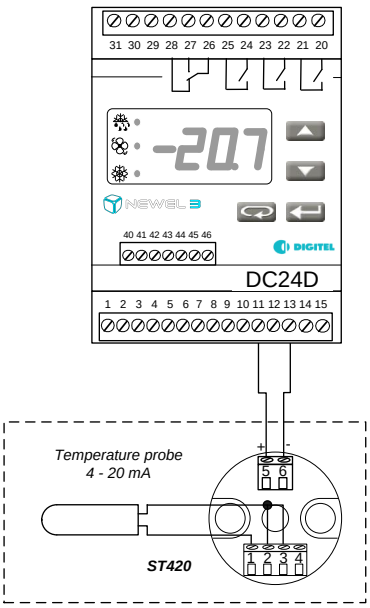


Figure 5.3.9

5.4. RESTRICTIONS 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.

5.5. SETPOINT OFFSET

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

5.5.1. NONE ([P4=0])

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

5.5.2. 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].**

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 5.11**). The pressure alarm limits programmed in **[o1]** and **[o2]** will be offset at the same time and by the same value as the setpoint.

[cF3] Display unit (Mode of operation)
[cF4] Refrigerant 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)

5.5.3. 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 one of temperature probes declared as network variable on one of cooling units The installation must be equipped with a DC58 central monitoring unit.

5.5.4. FLOATING LP ([P4=2])

With parameter **[P4]** programmed to 2, the LP regulation function will automatically increase 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 DC58 central unit.

5.6. 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]**.

A more efficient load shedding, that affects the cooling units, can be programmed with a DC58 central unit. See chapter **12.13.13.**

[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)

5.7. 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. For a normal operating mode these parameters must be set at 0.

5.8. 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.

5.9. 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.

5.10. DC25

Diagrams **5.2.1** and **5.2.2** show an economic configuration. A digital input without potential is assigned to each compressor to monitor its safety chain (e.g. terminal 5 for compressor no. 2). A break in the chain sets off an alarm and switches off the corresponding compressor.

By adding module DC25, there are five 230VAC digital inputs available per compressor. This allows simpler wiring and more detailed monitoring of the compressors. The diagram below illustrates an example of the connections in the presence of three compressors.

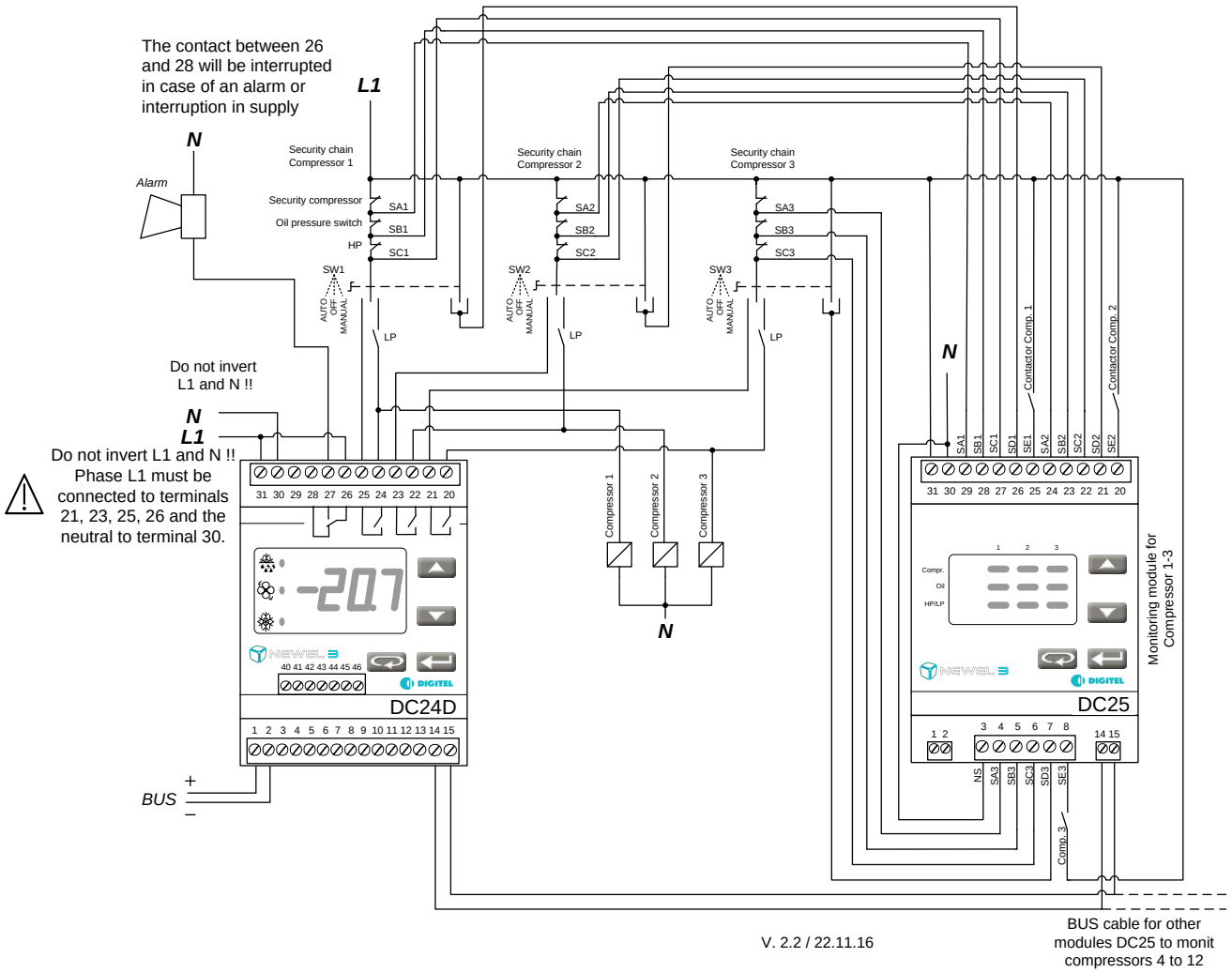


Figure 5.10.1

With this configuration, remote management indicates which part of the safety chain is switched off (compressor safety, oil pressure switch or high pressure switches).

Operation of SD and SE inputs (S1D, S2D...) is programmable in **[L12]** and **[L13]**, respectively.

0 - Display of the entry status in TelesWin.

1 - Compressor stops when the contact is closed. No alarm is activated.

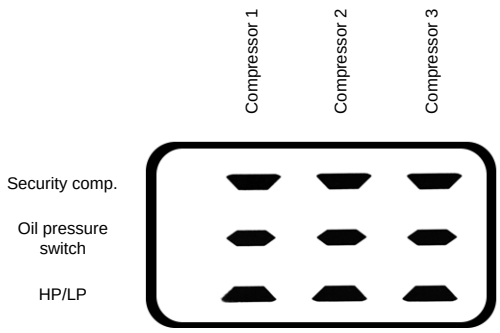
2 - Compressor stops when the contact is opened. No alarm is activated.

3 - Display the state of the contactor controlling the corresponding compressor.

In the example shown in Figure 5.10.1, parameter **[L12]** is programmed to 2 and **[L13]** to 3. In case of failure of the controller, switching of switches SW1, SW2 and SW3 to the "manual" position ensures an emergency operation using the low pressure switches. The status of the contactor that controls the compressor is shown on the screen of the remote control. Power meters and records also reflect the real state of the compressor (on or off).

For compressors no. 4-6, a second module DC24D and a second DC25 must be added. Similarly, for each additional group of three compressors (maximum 12 compressors in total), a DC24D and an additional DC25 are added. All these modules are connected in parallel to the local communication bus (terminals 14 and 15). With the basic setup procedure, their addresses (parameter **[cF1]**) are programmed in modules DC25. The module monitoring compressors 1-3 must have the address 0 (**[cF1]** =0), which monitors compressors 4-6 with address 1 (**[cF1]** =1), etc. Each monitoring module DC25 has the same address as module DC24D that controls the corresponding compressors.

In normal operation, the DC25 display provides the safety status. A flashing segment indicates that the corresponding safety contact is switched off.

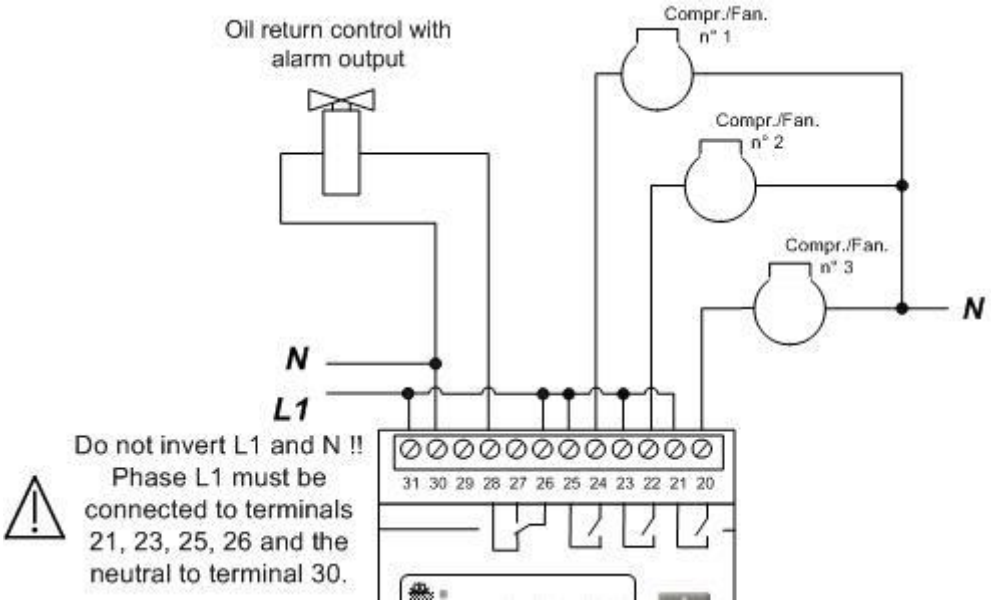


Parameter **[L11]** of the driver must be set to 1 when the module (s) DC25 is used. For configurations according to **Figure 5.2.1** and **Figure 5.2.2** it must be set to 0.

[cF1] Slave address (Basic configuration)
[L11] Ambient temperature high limit (°C) (Parameters menu)
[L12] Delay of ambient temperature alarm (Min) (Parameters menu)

5.11. OIL RETURN CONTROL WITH ALARM OUTPUT

It is possible to control the compressor oil return control via the alarm output of the controller used for compressor management. This setting can only be made with TelesWin. The "Oil return command with alarm output" option is located in the Settings tab under Additional functions. Once this option is selected, two additional options appear to determine the duration of the oil return cycle in seconds and the duration of the oil return pulse in seconds.



5.12. WEEKLY SCHEDULE

This option will only be available with central unit DI58/DC58

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)

Basic configuration

Sym.	Lvl.	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.*		1	
cF1	3	CF1 – slave address *0=pilot-compressors 1 à 3 1= compressors 4 à 6* *2= compressors 7 à 9 3= compressors 10 à 12*	r1 = 1	0	
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	Refrigerant fluid *1 = R12 2 = R22 3 = R134A 4 = R502 5 = R500* *6 = MP39 7 = HP80 8 = R404A 9 = R717 (NH3) 10 = Frozen water* *11 = R407 (Fluid) 12 = R407 (gas/fluid) 13 = R23* *14 = R413A (ISCEON 49) 15 = R417A (ISCEON59) 16 = R422A (ISCEON79)* *17 = R507 18 = R744 (CO2) 19=R723 20 = PerformaxLT_ST 21 = R290* *22 = tConvR407A_Fluid 23 = tConvR407A_Gas* *version 17421 onwards: 24 = R448A 25 = R449A 26 = R450A(N13)* *version 19301onwards: 27 = R513A 28 = R452A* *version 20471 onwards: 29= RS-51*	r1 = 1	8	
AD	3	Module's address *Don't change it when the module is connected to a DI58/DC58 central unit.*			

Parameters

	Sym.	Lvl.	Function	comment	Default value	Val. Utilis.
	PAS	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)	P4 = 1	0	
			Offset in relation to exterior temperature	P4 = 2 & cF2 = 1	10.0	
	P6	2	Start of setpoint offset (HH.M)	P4 = 1	0	
			Lower setpoint limit (°C)	P4 = 2	25.0	
	P7	2	End of setpoint offset (HH.M)	P4 = 1	0	
			Upper setpoint limit (°C)	P4 = 2	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	
	P12	2	Proportional coefficient (0-100 std = 30)		0	

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	

Configuration	L1	2	Selection of compressor/fan to be switched *0 = according to operating time 1 = always in the same order*		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	
	L11	2	Monitoring of the safeties *0 = terminal 4 to 6 of the DC34, 1 = with the DC25*			
	L12	2	Function of the contacts S1D, S2D, S3D of the DC25 *0 = visualisation, 1 = stop of the compressor at closure of contact, 2 = stop of the compressor at opening*			
	L13	2	Function of the contacts S1E, S2E, S3E of the DC25 *0 = visualisation, 1 = stop of the compressor at closure of contact, 2 = stop of the compressor at opening*			
	L14	2	Additional functionalities *0 = none, 1 = gas concentr. Monitoring, 2 = command of the oil reflux with the alarm outlet*			
	L15	2	Probe used for the regulation *0 = 4-20mA sensor(terminals 11-13), 1 = 0-10V sensor (terminals 45-46), 2 = probe F (terminals 40-42)*			

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 1 = alarm upon opening* *2 = shutdown of all compressors upon contact closure 3 = display* *4 = setpoint offset upon contact closure* *5 = load shedding upon contact closure* *7 = shutdown of all compressors upon contact opening*		0	
	o5	2	Alarm delay (min)	o4 = 0 ou 1	30	
	o6	2	Function of contact C2 *0 = alarm upon closure 1 = alarm upon opening* *2 = shutdown of all compressors upon contact closure 3 = display* *4 = setpoint offset upon contact closure* *5 = load shedding upon contact closure* *7 = shutdown of all compressors upon contact opening*		0	
	o7	2	Alarm delay (min)	o6 = 0 ou 1	30	
	o8	2	Level 1 password (user)		0	
	o9	2	Level 2 password (operating engineer)		0	
	o10	2	Level 3 password (installer)		0	
	o11	2	Special configuration		0	

			0 = none 1 = Monitoring gas concentration			
	o12	2	Warning limit high CO2 concentration (%)	o11 = 1	0	
	o13	2	Warning limit too high CO2 concentration (%)	o11 = 1	0	
	O14	2	Type of CO2 sensor *0 = Gazex, 1 = Inosent*	o11 = 1	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	Day 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

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 no. 7-12
	13	Alarm contact C1
	14	Alarm contact C2
	17	Fault on an auxiliary unit
	18	Failure CO2 Sensor
	19	Warning – high CO2 concentration
	20	Alarm – too high CO2 concentration
	24	Fault on probe E
	25	Fault on probe F
	26	Discharge temperature excessively high
	27	Overheat to excessively low