XC15/35CX: new controllers for single and tandem condensing units

Dixell presents a new controller developed for the management of condensing units with single and double compressor.

Dixell presents two new controllers suited to control small and medium condensing units, the XC15CX and the XC35CX. The last one is able to manage up to two compressors (standard ON/OFF, digital or inverter-controlled), and up to two ventilators (standard ON/OFF or modulated type). Moreover, the supported modulating ventilators can be both electronic ventilators (which use a 0÷10Vdc command signal) and ventilators controlled in phase-cut mode. The XC35CX is characterized by its versatility; in fact it can be used both in “entry level” condensing units (one compressor and one ventilator) and medium condensing units (up to 2 compressors whereof one with variable capacity). Specific functions for the regulation optimization, for the control of malfunctioning status and for the energy saving, make this controller one of the most completed and reliable for the customer.
The series includes the XC15CX model which is equipped with only one relay. This model has the same functions of the XC35CX, but is normally used in condensing units with single compressor.

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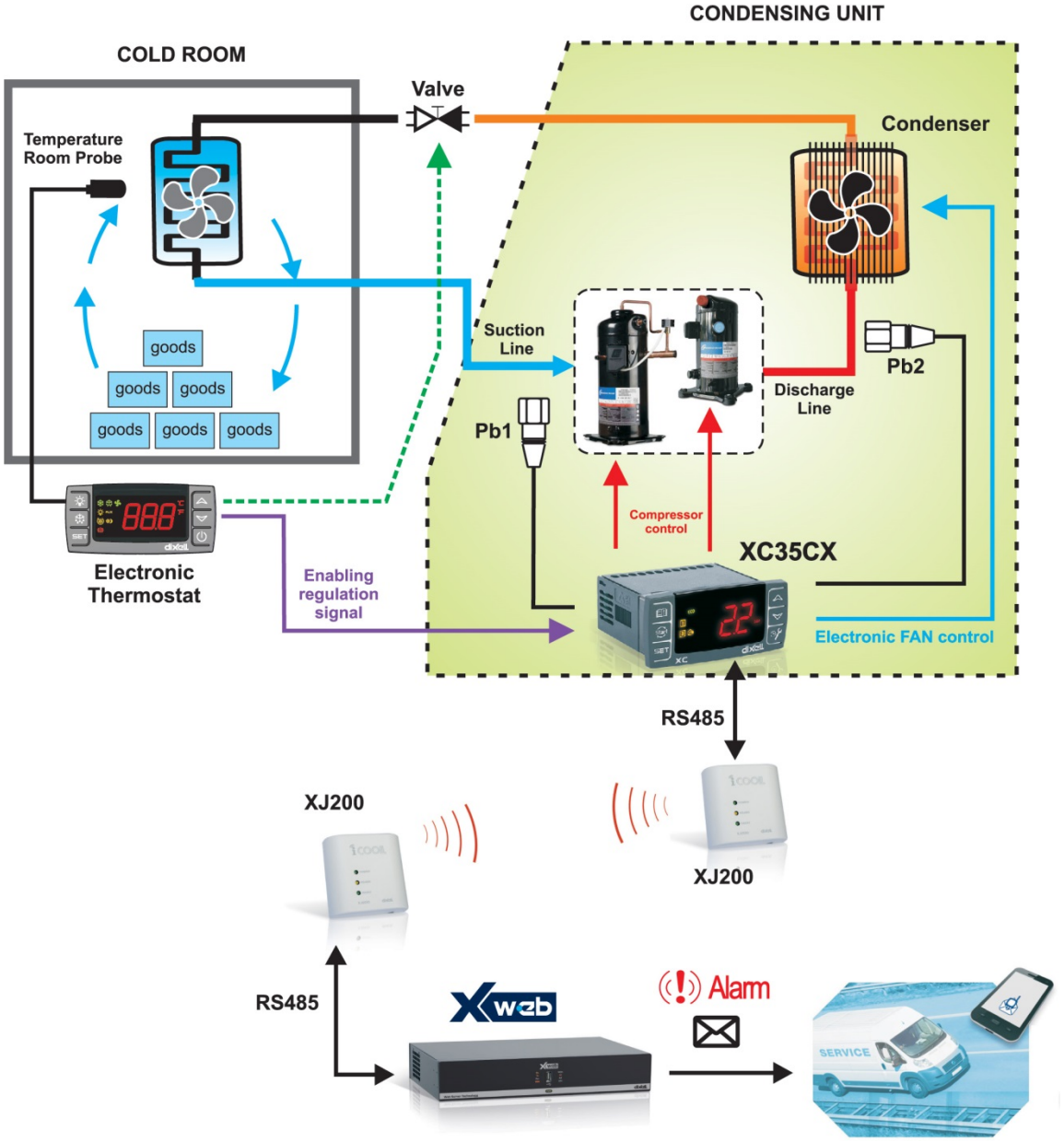
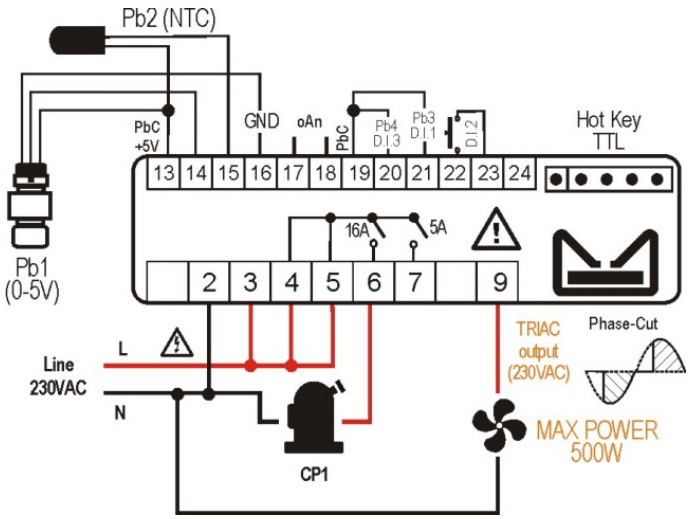
1 MAIN APPLICATIONS

XC15/35CX controllers are used in such applications where the plant needs a centralized condensing unit, such as convenience stores or butcher shops with one cold room or in small supermarkets with a limited number of devices (both NT and LT).



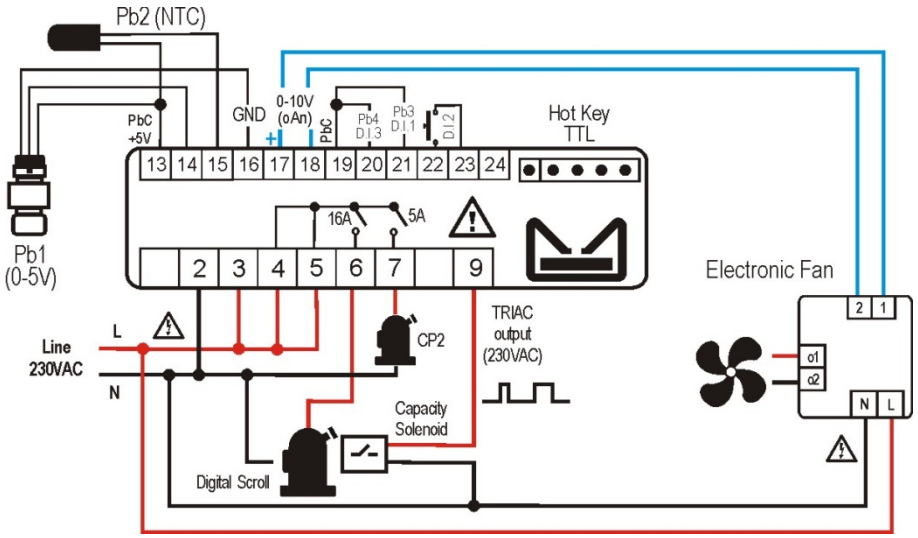
1.1 STANDARD CONDENSING UNIT WITH A MODULATED VENTILATOR (XC15CX and XC35CX)



P1: regulation probe for compressor
P2: regulation probe for ventilators
oA1=CP1: ONOFF compressor
oAn=PCF: phase-cut ventilator control

NOTE: the XC15CX model (with the only 16A relay) can be used in this application

1.2 TANDEM CONDENSING UNIT WITH DIGITAL SCROLL (XC35CX)



P1: regulation probe for compressor
P2: regulation probe for ventilators
oA1=dGt: digital scroll compressor
oA2=CP2: ONOFF compressor
oAn=dGt: digital scroll discharge valve control
oAn=ECF: electronic ventilator control

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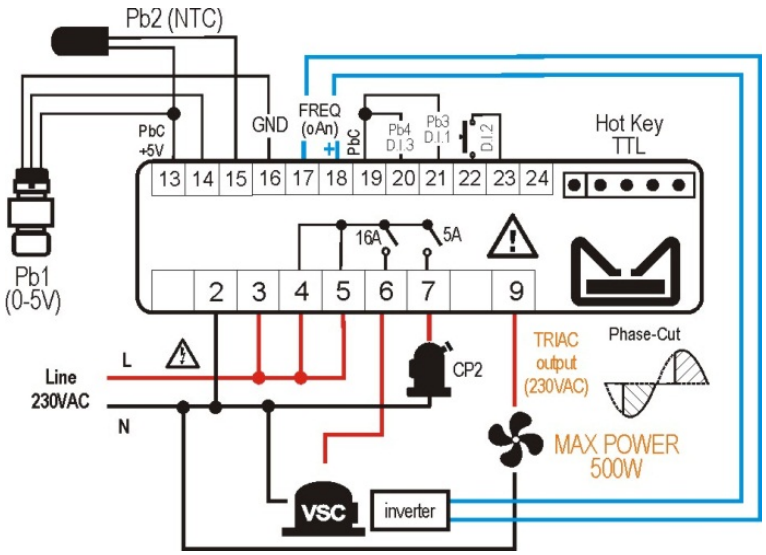
1.3 TANDEM CONDENSING UNIT WITH INVERTER-CONTROLLED COMPRESSOR (XC35CX)



P1: regulation probe for compressor

P2: regulation probe for ventilators

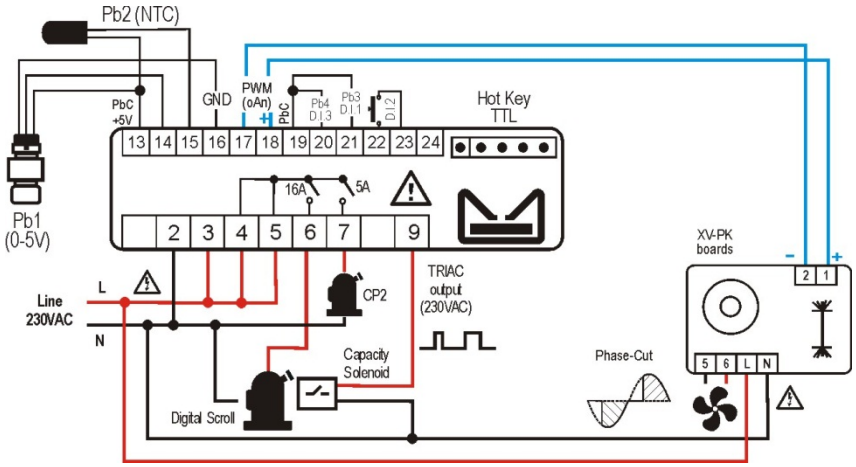
oA1=inV: optional for power supply of variable speed compressor

oA2=CP2: ONOFF compressor

oAn=PCF: phase-cut ventilator control

oAn=inV: command signal for inverter

1.4 TANDEM CONDENSING UNIT WITH A PHASE-CUT EXTERNAL MODULE FOR VENTILATORS (XC35CX)



P1: regulation probe for compressor

P2: regulation probe for ventilators

oA1=dGt: digital scroll compressor

oA2=CP2: ONOFF compressor

oAn=dGt: digital scroll discharge valve control

oAn=ECF: control (PWM) of phase-cut external module (ex. XV05PK)

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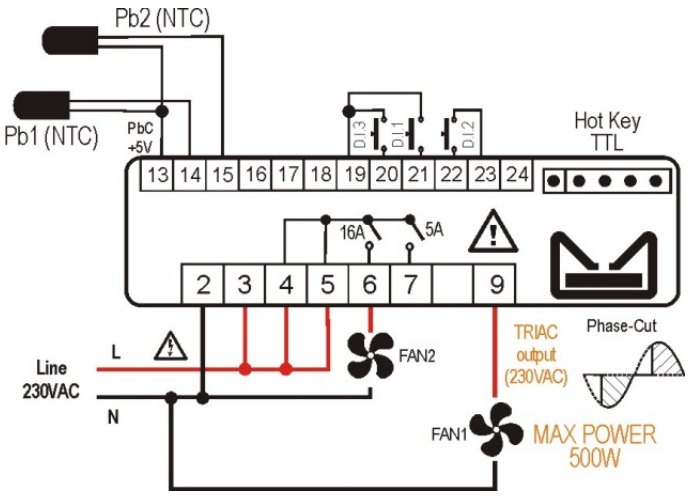
1.5 CONDENSING CONTROL WITH MODULATED VENTILATOR AND A SECOND ON/OFF VENTILATOR: “FAN BOOSTER” (XC15CX and XC35CX)



P1: regulation probe for ventilators

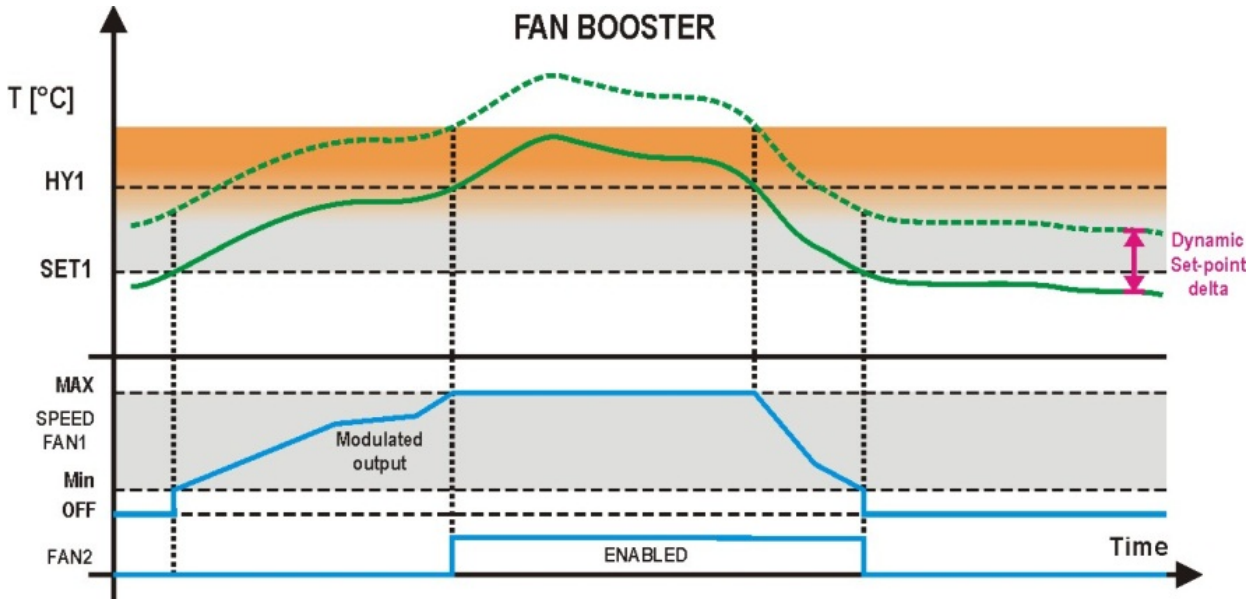
P2: probe for dynamic SETPOINT calculation

oA1=Fn1: ONOFF ventilator

oAn=PCF: phase-cut ventilator control

NOTE: the XC15CX model (with the only 16A relay) can be used in this application

The XC35CX, configured as Fan Booster, allows regulating the condensing through one modulated ventilator (FAN1) and one ON/OFF ventilator (FAN2) enabled only if necessary. Furthermore the Dynamic Set Point function can be used to adjust the condensing to the external temperature.



2 MAIN FEATURES

XC15/35CX are characterized by a series of specific functions for the management of condensing units. Follow a description of the main features.

2.1 FREE COMPRESSOR SELECTION

It is possible to manage both standard (ON/OFF) and variable capacity compressors (both with digital and inverter-controlled). Inverter-controlled compressors allow the use of both voltage (0÷10Vdc) and frequency (range from 50 to 500Hz and fixed duty cycle) command signal.

2.2 FREE VENTILATOR SELECTION

According to available hardware resources (depending on the number and the type of compressors) the controller can manage up to 2 standard (ON/OFF) ventilators, with the possibility to use the rotation mode, or modulated ventilators. The supported modulated ventilators can be controlled in phase-cut mode (through internal TRIAC and up to 2.2Amax@230VAC) or electronic controlled ventilators (through 0÷10Vdc command signal). Furthermore it's possible to use external phase-cut fan speed controllers (ex. XV05PK, XV10PK or XV22PK models) when higher currents are required to drive condenser fans.

2.3 VENTILATORS CONTROLLED IN PHASE-CUT MODE

The TRIAC output (**oA3**) can drive one or more ventilators controlled in phase-cut mode (maximum current 2.2A@230VAC). The regulation is proportional into the regulation band identified by the **St2** condensing setpoint and the related **HY2** differential.

2.4 ALARMS DATABASE

An internal database can memorize the last 10 alarm events (warning and lockout alarms). The complete list of alarm events can be checked by pressing a frontal key. Once a new alarm is detected, the relative alarm database icon will blink. The recording mode is FIFO type.

2.5 ENERGY SAVING

One of the digital inputs can be set to activate the energy saving mode. This function is available in both regulation setpoints (**St1** and **St2**) through dedicated parameters.

2.6 "BUMP-START" FUNCTION

This function is available only when ON-OFF compressors are used and for the management of cold start up. During long interruptions (par. **bMi**) and in case of environmental cold temperature, it is possible to activate the compressor for short cycles (par. **bon** and **boF**) and for a certain number of times (par. **nub**) in order to facilitate the liquid ejection from inside the compressor itself.

2.7 SILENT MODE

The activation of the silent mode reduces the maximum allowed speed for modulated ventilators. This function can be enabled through digital input (**inx=SiL**) or during predefined intervals (holiday or working days) for models with RTC.

2.8 REGULATION PROBES

XC15/35CX are able to manage ratiometric pressure probes (0÷5Vdc), or NTC10k, NTC86k or PT1000 temperature probes (depending on the hardware configuration). By using PT1000 probes, it is possible to extend the functioning range from -100°C to +200°C. The extended range permits to control the discharge line temperature or the compressor head overheating.

2.9 COMPATIBILITY WITH R290 & R600a GASES

XC15/35CX controllers mount relays suitable for ATEX applications as they have been tested following EN60079-15. They are suitable for applications where R290 (Propane) and R600a (Isobutane) gases are used.

2.10 INFO MENU

By using **UP** and **DOWN** keys it's possible to enter the info menu and check the following variables.

Variable	Meaning
P1	Probe P1 value (suction line)
P2	Probe P2 value (condensing line)
P3	Probe P3 value
P4	Probe P4 value
tdG	Modulation interval for digital compressors
PEr	TRIAC output activation (in percentage)
Aou	Analogue output value (in percentage)
rEL	Firmware release
FdY	Firmware release date (day)
FMn	Firmware release date (month)
FYr	Firmware release date (year)

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2.11 SERVICE MENU

The **SERVICE** menu is accessible by using the SERVICE button. This menu allows reading the following values.

Variable	Meaning
n1H	Activation number for output oA1 (thousands of)
n1L	Activation number for output oA1 (unit of)
n2H	Activation number for output oA1 (thousands of)
n2L	Activation number for output oA1 (unit of)
o1H	Number of working hours for output oA1 (thousands of)
o1L	Number of working hours for output oA1 (unit of)
o2H	Number of working hours for output oA1 (thousands of)
o2L	Number of working hours for output oA1 (unit of)
dPx	Real probe Px value
dix	Status of digital input “x”
rSt	Restart regulation enabled in case of lockout alarm
rSC	Couter reset enabled
FdY	Firmware release date (day)
FMn	Firmware release date (month)
FYr	Firmware release date (year)
rEL	Firmware release
Ptb	Parameter map progressive number

2.12 DISCHARGE LINE TEMPERATURE CONTROL

This function is used with variable capacity compressors (digital or inverter-controlled) and it allows controlling the discharge line temperature of the compressor in order to limit possible damages. The regulator uses one temperature probe (optionally among NTC10k, NTC86k or PT1000) and an alarm threshold (par. **dLt**). Once this threshold is exceeded, the maximum compressor capacity is limited to a preset value (par. **Cdd**) for a fixed period of time (par. **dLd**), before stopping the regulation. The regulation will restart once the temperature goes under another preset threshold (par. **dth**) and after a minimum cooling interval of time (par. **dCt**).

2.13 SERIAL COMMUNICATION

Thanks to the TTL-RS485 (XJ485CX) converter the controller can be connected to a monitoring system (ex. XWEB family). In this way the functioning data of the condensing unit are accessible remotely.

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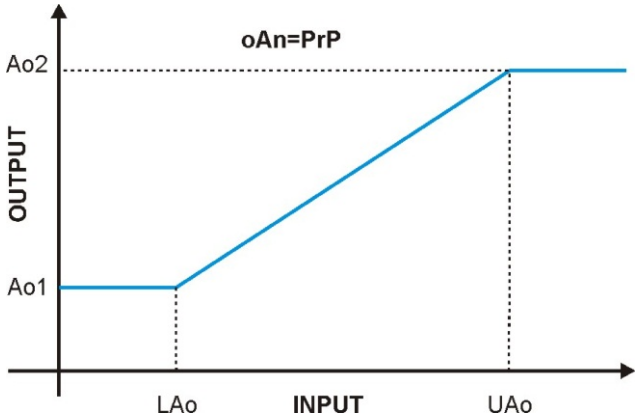
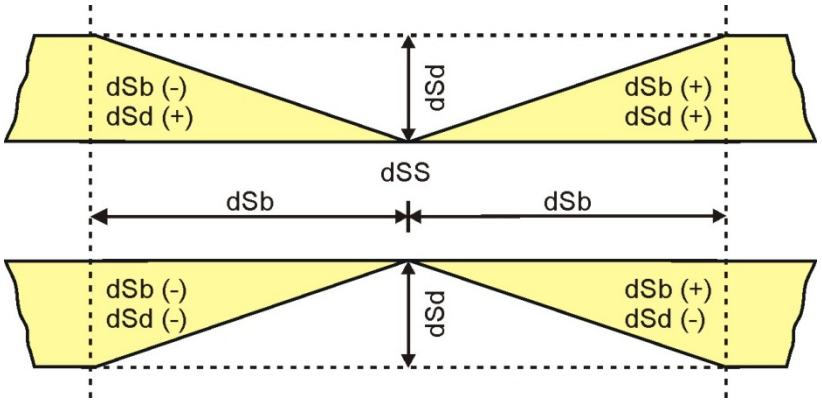
2.14 ANALOGUE REPEATER



The analogue output can act as proportional repeater (parameter **oAn=PrP**) following the value measured from the variable set in the par. **AoP** in the range between the **LAo** and **UAo** parameters.

2.15 DYNAMIC SET POINT



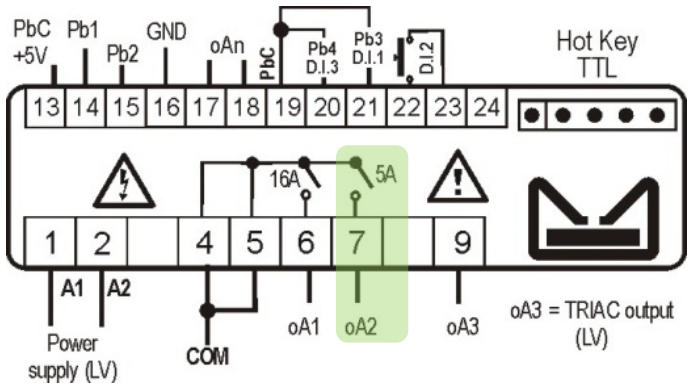
The DYNAMIC SET POINT function (par. **dSS**) moves the condensing regulation band (par. **dSb**) depending on the external temperature. The condensing regulation setpoint (**St2**) will be increased proportionally (par. **dSd**) to the external temperature.

2.16 ANTI-RESONANCE FUNCTION

Using inverter-controlled compressors it's possible to enable up to 3 skip frequency bands (which are not allowed intervals of operation for the compressor) in order to avoid resonance working conditions.

3 WIRING DIAGRAMS

3.1 Power supply 24Vac, 50/60Hz



Pb1, Pb2: ratiometric regulation probes or NTC10k

Pb3, Pb4: NTC10k, NTC86k temperature probes or PT1000 (depending on the model)

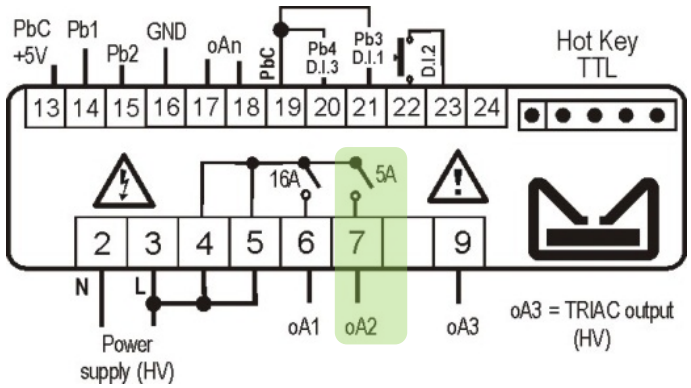
oA1: relay output 16A configurable

oA2: relay output 5A configurable (not available for the XC15CX model)

oA3: TRIAC output internally connected to the power supply line ("**A1**", 24VAC)

NOTE: oA1 and **oA2** outputs can directly drive high voltage loads

3.2 Power supply 110, 230Vac, 50/60Hz



Pb1, Pb2: ratiometric regulation probes or NTC10k

Pb3, Pb4: NTC10k, NTC86k temperature probes or PT1000 (depending on the model)

oA1: relay output 16A configurable

oA2: relay output 5A configurable (not available for the XC15CX model)

oA3: TRIAC output internally connected to the power supply line ("**L**")

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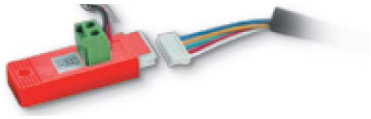
4 ACCESSORIES

	**J7MAZZZ910**	**XJ485CX:** TTL-RS485 converter
	**BE079302 00**	**PPR15:** ratiometric pressure probe, 2.0m, 0T15 bar
	BE079302 02	**PPR30:** ratiometric pressure probe, 2.0m, 0T30 bar
	**BE909201 01**	**PP101:** ratiometric pressure probe
	BE909201 02	**PP102:** ratiometric pressure probe
	BE909201 03	**PP103:** ratiometric pressure probe

5 HOW to ORDER

XC15/35CX – A B C D E

A		B		C			D			E	
Power supply		Measurement unit			P3 and P4 probes	Buzzer		RTC	Analogue output	P1 and P2 probes	
2	24Vac/dc	**B**	bar/°C	**0**	NTC10k	No	**0**	No	No	**G**	P1=0-5V
4	110Vac	**P**	PSI/°F	**1**	NTC86k	No	**2**	No	PWM		P2=NTC10k
5	220Vac			**2**	PT1000	No	**3**	No	0-10Vdc	**H**	P1=0-5V
				3	NTC10k	Yes	**4**	Yes	PWM		P2=0-5V
				4	NTC86k	Yes	**5**	Yes	0-10Vdc		
				5	PT1000	Yes					

6 PRICES

Contact our sales department for prices.

7 AVAILABILITY and ORDERS

Both XC15/35CX models will be available starting from the end of October 2014 with standard delivery time.

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