

XC645CX

October 2011



Index

XC645CX Overview

Probes, Digital Inputs and Load Connections

The Interface

Installation and Configuration

Accessories



XC645CX Overview

Controller for Compressor Racks with Digital Scroll Management

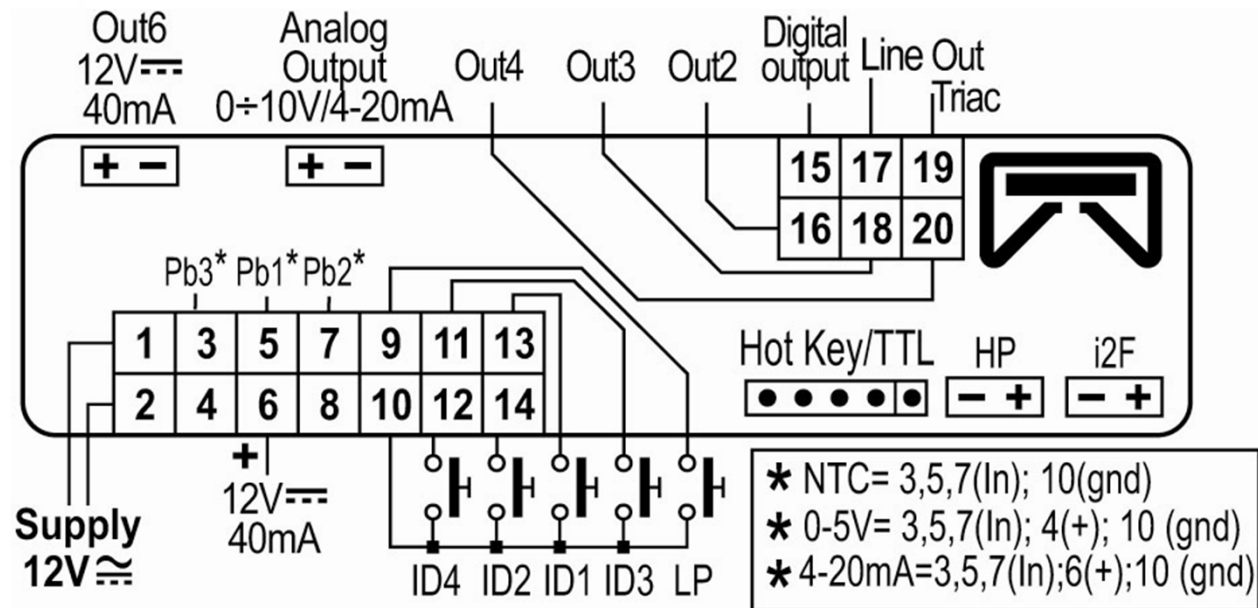


- ✓ Management of tandem condensing units with 1 digital scroll compressor, 1 standard compressor and up to 2 fans
- ✓ Up to: 3 probe inputs, 4 fan/compressor outputs, 7 digital inputs
- ✓ 1 output for digital scroll compressor
- ✓ 3 additional outputs configurable on fans or compressors
- ✓ Alarm logger built-in
- ✓ Type of probes: NTC/0 5V/ 4 20mA selectable by parameter
- ✓ Type of control: proportional band or neutral zone
- ✓ Standard communication protocol ModBUS-RTU

XC645CX Overview

Main Features

- ✓ Solution for compact rack applications with digital compressor
- ✓ Management of both compressors and fans
- ✓ Condensing Set point optimized according to the external temperature (Dynamic Set Point)
- ✓ Serial line communication for monitoring systems



XC645CX Overview

New Features - compared to the XC600C series

- ✓ Easier pressure transducers setting
- ✓ Absolute pressure alarms (independent from the set points)
- ✓ High condensing pressure alarm with compressor unloading
- ✓ Electronic low pressure-switch
- ✓ Analog output (0-10V) for condenser fan speed (linear inverter)



XC645CX Overview

Main Features

- ✓ Digital input for liquid level alarm
- ✓ Safety alarm input for each load
- ✓ Type of gas setting: to control temperature or pressure
- ✓ Load running hours signaling for maintenance
- ✓ Display with integrated engineering unit (C / F / bar / PSI)
- ✓ 0 10V output for fan speed controllers (chopped phase device or inverter)



XC645CX Overview

Technical Features

Power Supply	12, 24Vac/dc
Display	dual with icons
Keyboard	6 buttons

Probe Inputs

Suction Pressure	0÷5V/4÷20mA/NTC (10K)
Condensing Pressure	0÷5V/4÷20mA/NTC (10K)
Discharge Temperature	NTC (10K or 86K)

Digital Inputs

COMP 1 Safety	pres
FAN 1/COMP 2 Safety	pres
FAN 2/COMP 3 Safety	pres
FAN 3/COMP 4 Safety	pres
FAN 4/COMP 5 Safety, Liquid Level, E.S.	config
LP Pressure Switch	pres
HP Pressure Switch	pres

Relay Outputs

Digital Scroll	5A
FAN 1/COMP 2	5A
FAN 2/COMP 3	5A
FAN 3/COMP 4	5A

Other

Hot Key Output	pres
Serial Connections	TTL/ModBUS-RTU
10V Output for Fan Speed	pres
Alarm Recording	last 20
Buzzer	opt
5 th Output (Comp 5/Fan 4/Alarm)	12V
TRIAC for Digital Scroll	230Vac-1A

Connections

Terminals	Disc. Terminal Blocks
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Index

XC645CX Overview

Probes, Digital Inputs and Load Connections

The Interface

Installation and Configuration

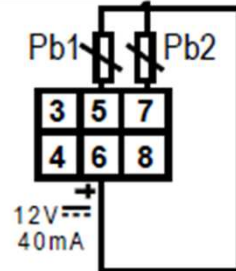
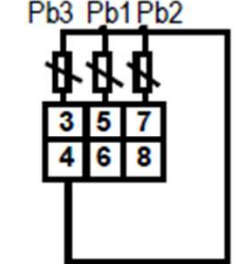
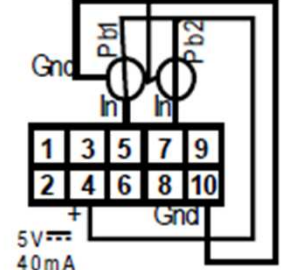
Accessories



Probes, Digital Inputs and Load Connections

Probe Connections

Controller can manage 3 kind of probes: NTC/4-20mA/0-5V

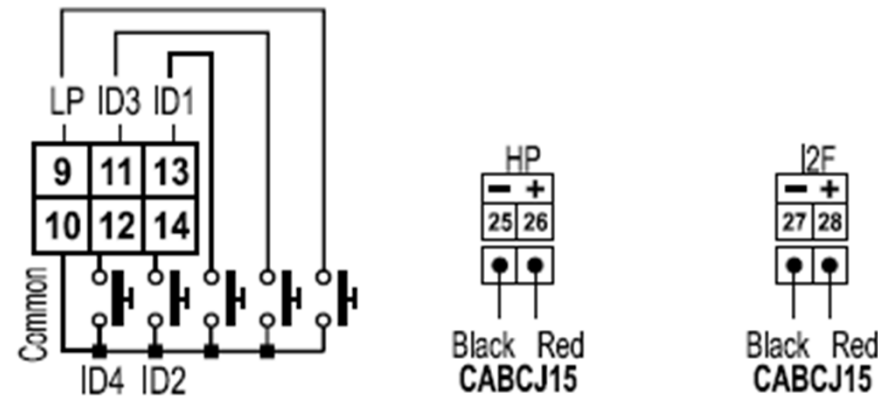
<p><u>PP07 PP11, PP30, PP50 4÷20mA pressure transducers</u> respect the polarity. Suction (P1C = Cur) Brown (+) to terminal 6 ; white (-) to terminal 5 Condenser (P2C = Cur) Brown (+) to terminal 6 ; white (-) to terminal 7</p>	
<p><u>Temperature probes (NTC 10K)</u> Suction: 4-5 (P1C = NTC) Condenser: 4-7 (P2C = NTC) Pb3 (P3C = NTC): 4-3</p>	
<p><u>Ratiometric transducers (0.5÷4.5Vdc)</u> Suction (P1C = 0-5) 5 (In); 4(+); 10 (gnd) Condenser (P2C = 0-5) 7 (In); 4(+); 10 (gnd)</p>	

Probes, Digital Inputs and Load Connections

Digital Input Connections

Controller has 1 safety digital input for each load, HP, LP and 1 configurable d. i.

All the digital inputs are FREE VOLTAGE

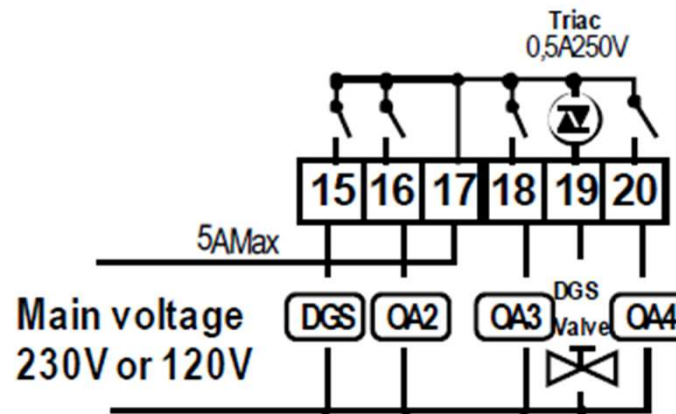


Probes, Digital Inputs and Load Connections

Load Connections

Digital Scroll valve coil MUST operate at main voltage (230Vac or 115Vac)!

PIN 17 is the common line for all the relay outputs and the TRIAC for the Dig. Scroll Valve



Index

XC645CX Overview

Probes, Digital Inputs and Load Connections

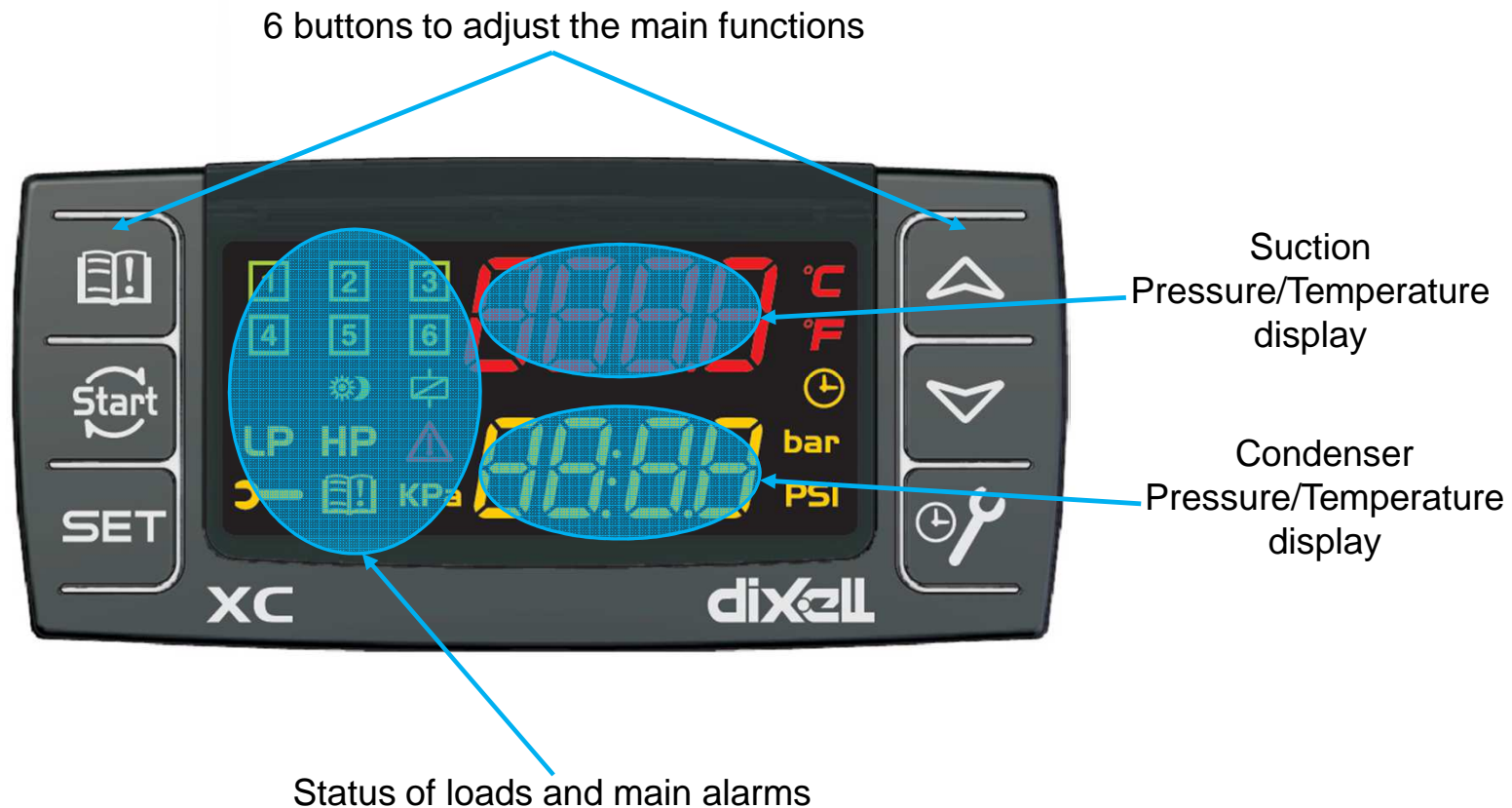
The Interface

Installation and Configuration

Accessories



The Interface



The Interface



SET (SET)

Standard visualization: to see or modify the set point.
In programming mode it selects a parameter or confirms an operation.

Alarm menu: By holding it pressed for **3s**, the current alarm is erased.

o (UP).


In programming mode: it browses the parameter codes or increases the displayed value.


With Hot key inserted: it starts the Hot key programming procedure.

To access the INFO menu: push and release it to access the INFO menu.

n (DOWN)

In programming mode: it browses the parameter codes or decreases the displayed value.

 **Manual restart of loads:** By holding it pressed for **3s**, it switches on again loads previous locked by a safety digital input alarm.

 **MAINTENANCE/CLOCK:** To display the loads running hours
By holding it pressed for 3s the **Maintaining menu** is entered

 **To enter the Alarm menu**

Index

XC645CX Overview

Probes, Digital Inputs and Load Connections

The Interface

Installation and Configuration

Accessories



Installation and Configuration

First Installation

In sequence these operations have to be done at first installation

1. Set the kind of gas, par. FtyP (r22, r404A, r510, r507, r134, r717 CO2)
2. Set the range of the pressure probe
 - a. Suction PP11 (-0.5 11bar), par. PA04, PA20
 - b. Discharge PP30 (0 30bar), par. FA04, FA20
3. Set the outputs (par. oA2 oA4)
4. Adjust the suction and condenser set points



Installation and Configuration

Plant Dimensioning

The XC645CX is pre-set to drive a rack with:

- a. Digital Scroll compressor.
- b. Compressor
- c. 2 Fans

For other kind of racks, parameters oA2 (16-17), oA3 (17-18) oA4 (17-20), oA6 (21-22) set the function of each relay according to the following possibilities:

- **Compressor:** oAi = cPr,
- **Step:** oAi = StP
- **Fan:** oAi = FAn
- **Alarm:** oAi = ALr
- **Injection of cooling liquid:** oAi = Lin
- **Inverter for condensing fan:** oAi = InF
- **Not used:** oAi = nu

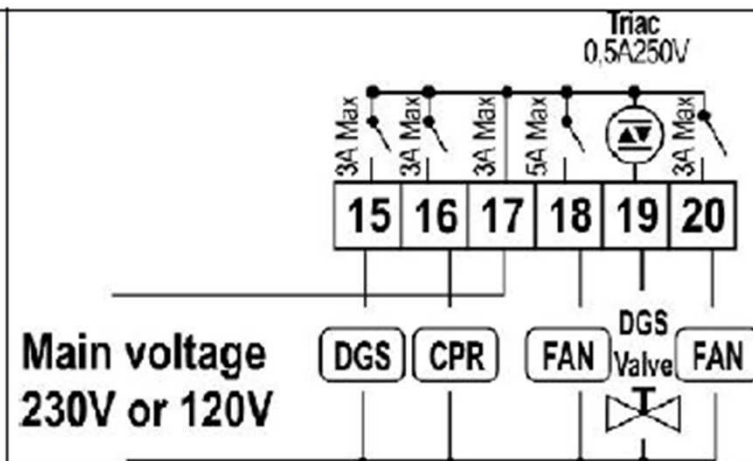


Installation and Configuration

Plant Dimensioning

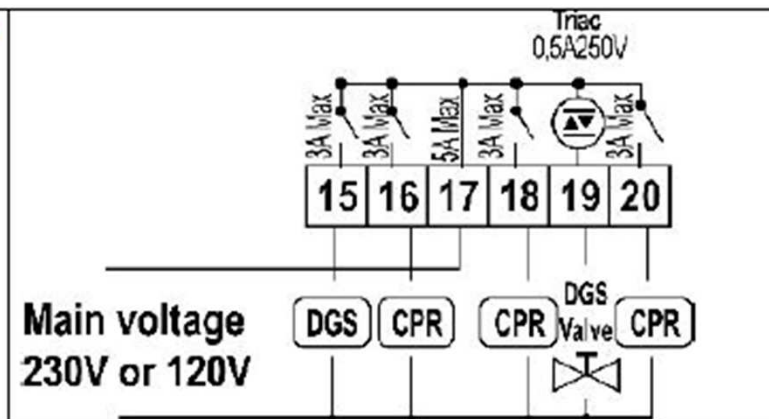
**Plant with 2 compressors
(one of them digital) e 2
fans:**

oA2 = CPr,
oA3 = FAn,
oA4 = FAn,



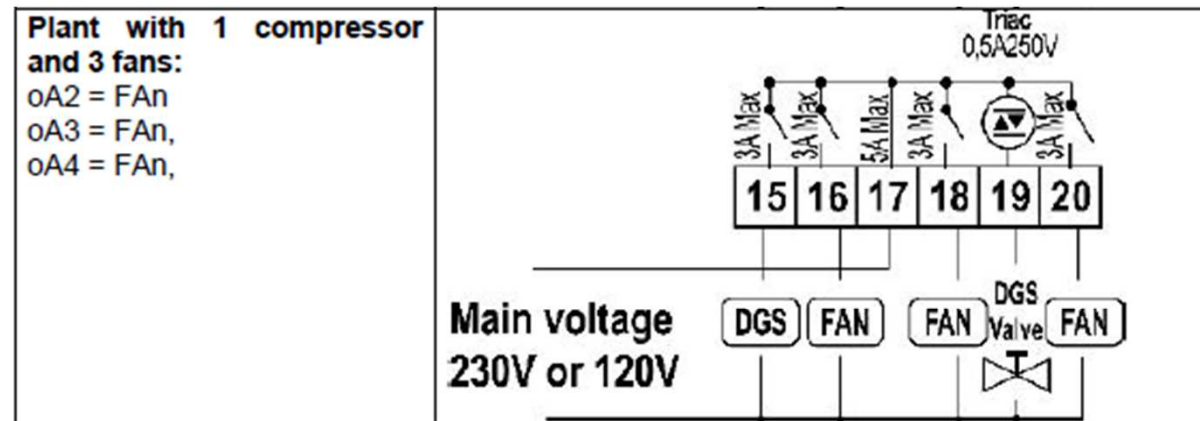
**Plant with 4 compressors
without fans:**

oA2 = CPr,
oA3 = CPr,
oA4 = CPr,



Installation and Configuration

Plant Dimensioning



Installation and Configuration

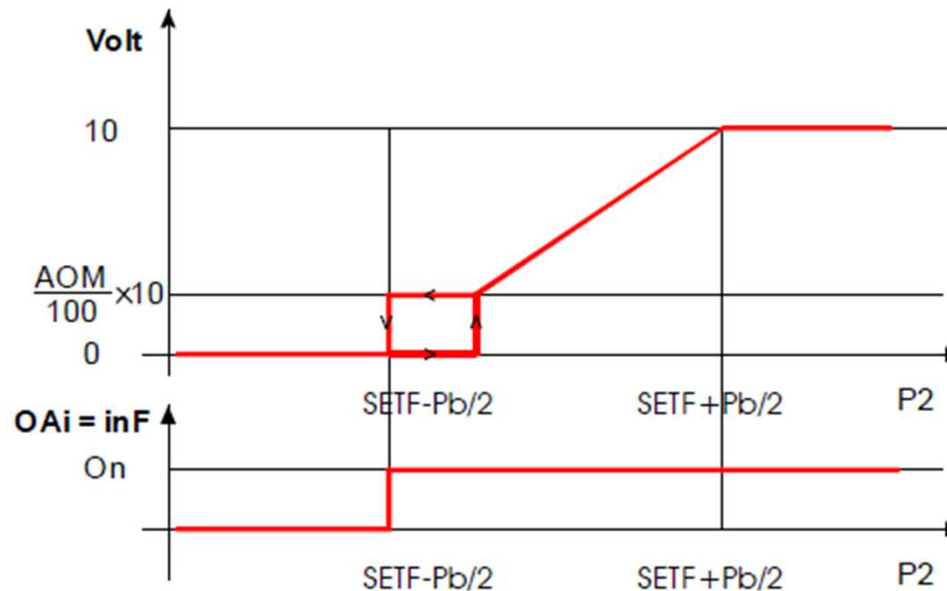
Fans at Variable Speed

Used when all fans of the condensing group are driven by one inverter or a chopped phase driver.

The fan speed is proportional to the condenser pressure value inside the regulation band ($SETF - Pb/2$ $SETF + Pb/2$).

How to set it

Parameters involved: $oA(i) = inF$; $AoC = tEn$, $AoP = P2$, $AOM = 30$,



- Set a relay to drive the invert ($oA(i) = inF$)
- Set the kind of signal of the analog output: "**AoC**": $tEn = 0$ 10V output; **cUr** = 4-20mA output
- Select the probe for the analog output) by the parameter **AoP**
- At last set also the percentage of analog output in case of probe failure: (0 100%)**SAO**

Installation and Configuration

Energy Saving

DYNAMIC SET POINT FOR FAN

Used to adapt the condenser temperature/pressure to the external conditions, to reduce the condenser set point when the temperature decreases

Parameters involved

dSEP Dynamic set point reference probe

nP = no probe: dynamic set point disabled;

P1= P1 probe

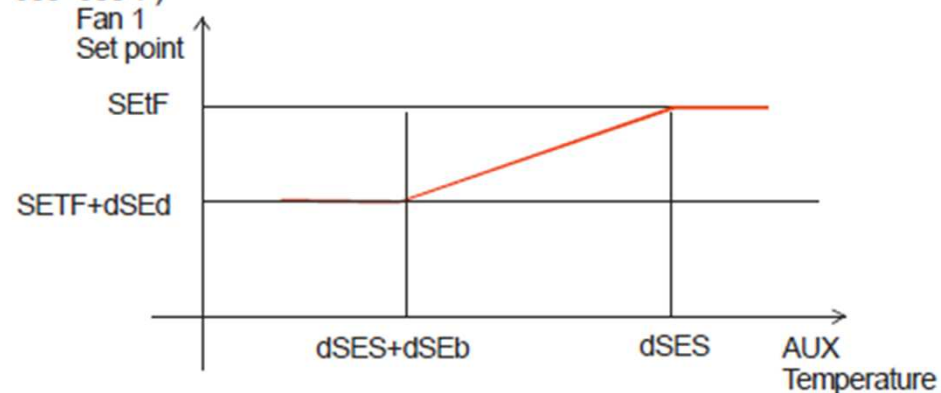
P2= P2 probe

P3= P3 probe

dSES External temperature value to start dynamic regulation (-50÷150°C; -58÷302 °F)

dSEb External band width for dynamic set point (-50.0 ÷ 50.0°C; -90 ÷ 90°F)

dSEd Set point differential for dynamic set point: (-20.0÷20.0°C; -50.0÷50.0PSI; -300÷300°F)



Index

XC645CX Overview

Probes, Digital Inputs and Load Connections

The Interface

Installation and Configuration

Accessories



Accessories

Components Related to the XC645CX

Name	Description	Part number
Transformer	TF5 230V/12Vac	CD050010 00
Wiring kit 1.5m and 3m	CWC15-Kit (1,5m) CWC30-Kit (3,0m)	DD500101 50 DD500103 00
Female disconnect able connector for digital input or analog output (4pcs)	CABCJ15 (1,5m) CABCJ30 (3,0m)	DD200101 50 DD200103 00
TTL /RS485 serial converter	XJ485CX+CABRS02	J7MAZZZ9AA
4-20mA suction pressure transducer	PP11 (-0.5÷11bar)	BE009302 07
4-20mA condenser pressure transducer	PP30 (0÷30bar)	BE009302 04
Hot key for programming	HOT KEY 4K	DK00000100



Accessories

3.1 CWC15KIT and CWC30KIT: wiring kits



The XC645CX is provided with 2 socket connectors with 14 and 6 pins.
For the wiring the **CWC15KIT** (1.5m cable length) or **CWC30KIT** (3.0m cable length) have to be used.

3.2 CAB CJ15 or CAB CJ30: 2 PIN connectors



NOTE:

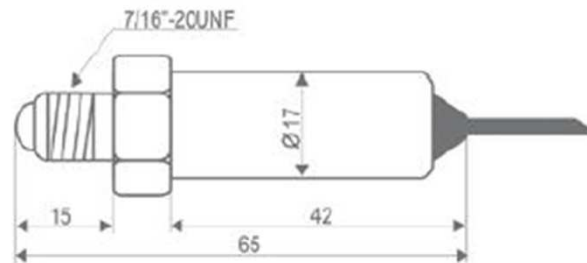
Use the connection cable **CAB CJ15** (1.5m length) or the **CAB CJ30** (3.0m length) for the:

- **HP digital input** (25-26),
- **i2F configurable digital input** (27-28),
- **0-10Vdc or 4-20mA analogue output** (23-24)
- **oA6, 12Vdc/40mA digital output** (21-22) :

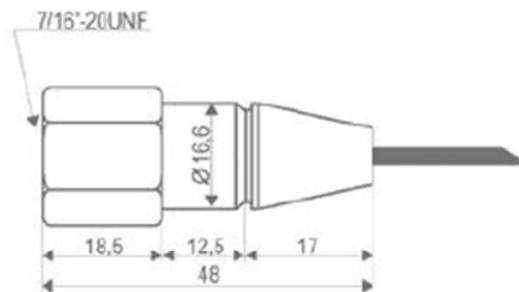
Accessories

3.3 PP07, PP11, PP30 PP50: 4÷20mA pressure transducers

PP07 - PP11 - PP30 - PP50 Bar



PP30FE



PP07 2,0MT -0,5+7bar rel FE
cod BE009302 00

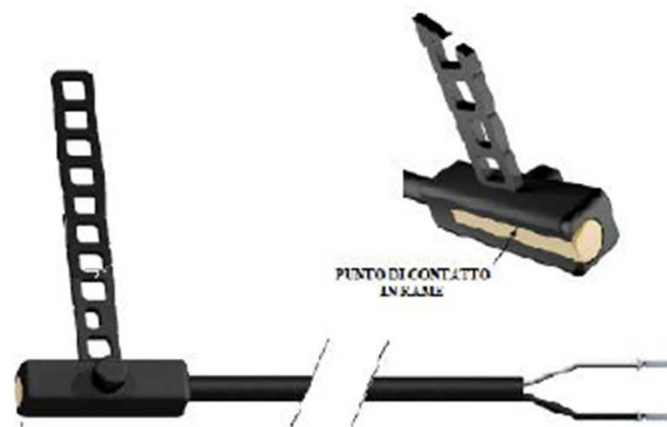
PP11 2,0MT -0,5+7bar rel FE
cod BE009302 07

PP30 2,0MT 0+307bar rel FE
cod BE009302 04

PP50 2,0MT 0+507bar rel Male
cod BE009002 07

Accessories

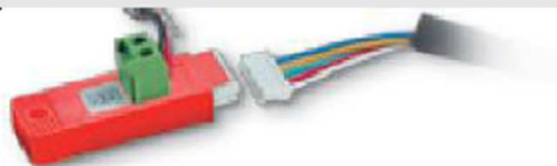
3.4 NP4-67: pipe mounting temperature probe



The **NP4-67** temperature probe can be used on the discharge line to monitor the discharge temperature of the Digital Scroll compressor.

NP4-67 1.5MT NTC probe
Measurement range: $-40+110^{\circ}\text{C}$,
Cable 1,5mt
Code BN609001 52

3.5 XJ485CX: TTL / RS485 serial converter



The **XJ485CX** is a TTL/RS485 external converter. Insert it into the TTL receptacle to convert the TTL output into a RS485 (+) and (-) signal for the monitoring system MODBUS_RTU compatible. (XWEB).