

# XIPT 1017 D +UCM 1514

## AIRCOOLED DIRECT EXPANSION UNITS WITH INVERTER SCROLL COMPRESSORS AND EC INVERTER PLUG-FANS. TOP AIR DISCHARGE



EC INVERTER PLUG FANS

INVERTER TECHNOLOGY



### General description

XIP precision air conditioners are to be considered as the most advanced solution to all problems of air conditioning in technological applications, as server farms, UMTS and GSM broadcasting power amplifiers, NOC (Network Operation Centres), computer racks cooling, control rooms, power equipment, and in general wherever heat loads are critically high.

The XIP direct expansion units with dedicated remote air condenser are able to work in XT LINE range up to 52° C of outside air temperature.

The XIP units are developed using the ecological refrigerant R410A, which allows environmental benefit thanks to its low impact on the greenhouse effect and high performance by virtue of the thermo-dynamic characteristics of this refrigerant.

Front panels are hinged, so the access is totally from the front; the most modern technical solutions and the best components grant air conditioners maximum versatility and longest reliability for critical applications.

A self-containing frame allows all panels and front door to be removed, reducing total weight for easy installation. Double panels (inner plate and insulated panel on the outside) allow optimal noiseless levels while functioning.

In precision applications, generated heat is mainly dry and input humidity is very low, with subsequent sensible heat ratio close to 85-95%. Having this in mind, we design our air conditioners to supply an extremely high heat ratio, increasing overall system efficiency. Server and computer rooms are constantly expanding, so air conditioners have to be flexible into satisfying needs, such as conditioner relocation, accessories add-up, etc. Our air conditioners can be easily repositioned, because weight is reduced to a minimum, thanks to the aluminum frame and to the panels removal system. Furthermore, all plates are already drilled for positioning and installation of all accessories, reserving the right for the Customer to install further accessories at any time after the purchase. Our air conditioners are highly reliable; nevertheless a good designing practice must assume some downtime. All systems have to be designed having in mind air conditioning redundancy, in order to supply continuous cooling during programmed maintenance. All our air conditioners are already preset in order to manage a cyclic redundancy of up to 12 units.

## **Structure**

Self-containing type, with internal parts in galvanised sheet and galvanised steel shape. The closure panels are painted with polyester dust (RAL 7016) ensuring the unit long lifetime and have an internal insulation with A1 class fire resistance thermal-acoustic material.

The air-tightness is realised thanks to fitted adhesive seals all along the panels perimeter. The electrical panel closure is provided with handle on the front and can be opened allowing an easy inspection. The access to all components is exclusively frontal from the hinged doors, no lateral technical space is required.

The bottom air discharge units features inspection windows that allow to keep the unit operational even while the closure panels are open. Rapid intervention time in ordinary and extraordinary maintenance operations is guaranteed.

## **Compressors**

“Three phase hermetic Scroll featuring brushless DC motor controlled by INVERTER. They are equipped with incorporated thermal protection and crankcase resistance, they are mounted on rubber shock absorbers. In the units with two cooling circuits, in case of one circuit failure the unit operation is guaranteed at 50% of cooling capacity.

The INVERTER control on the compressor allows to regulate the power distributed by the unit according to the thermal load of the plant, to the condensing pressure and to the external air temperature. It controls constantly the compressor ensuring the operation in the operating range (envelope). It features also soft-start logic which controls the inrush current at the unit boot.”

## **EC INVERTER Fans**

The EC PLUG-FANS combine reduced energy consumption with a sound-power level typical of impeller with backward-curved blades, but with a broad tonal distribution typical of the impellers with forward-curved blades. The impellers with backward-curved blades with low tonal frequency represent a highly energy efficient alternative to conventional centrifugal fans with forward-curved blades in noise-sensitive applications. The external rotors are designed in accordance with the EN60034-1 standards regarding rotating machines. The motor protection is IP54 according to EN60529.

## **Filters**

The filters have a M5 filtering class and are realised in latex and high-filtering capacity fibre, they are contained in a dedicated metal framework. The filters pleated structure with a wider frontal surface allows an elevated filtering efficiency and low pressure drops. In the top discharge versions the units feature a sealing system which ensures the correct air filtering. F7 efficiency filters can be mounted on demand.

## **Fin pack**

The standard finned pack is composed of aluminium fins provided with self-spacing collars which, in addition to guaranteeing a perfect spacing (fin pitch), ensure perfect contact with the copper pipe. The aluminium fins features a hydrophilic treatment to avoid drops dragging. The frame in galvanized steel with suitable thickness is developed over the entire perimeter of the coil in order to guarantee complete protection of the finned pack, copper bends and collectors. The fins are characterized by a wide exchange area and by an air crossing low speed, guaranteeing a high thermal exchange and low air side pressure drops. They also include a drain pan and a flexible pipe for condensing drain (drain pipe already included).

## **Differential pressure switch fans control**

Differential pressure switch for fans: any low pressure acts on the diaphragm of the pressure switch which, in turn, acts on a microswitch. The design of the device is such that the internal volume is minimal, allowing the pressure switch to operate with very small movements of air, increasing the safety and reducing operating delays.

## **Cooling circuit**

Realized in copper pipe, for all models it includes the following components : electronic thermostatic expansion valve, liquid receiver, dehydrator filter, liquid and humidity indicator, delivery line and liquid line turncock, high and low pressure switch (fixed calibration) and safety valve.

## **Electronic expansion valve**

The new generation of Close Control units includes the application of state-of-the-art technology, including the use of the electronic expansion valve. This innovative solution allows highly efficient regulation of the refrigerant flow, controlling it electronically, in a much more precise and stable manner than with a conventional mechanical expansion system.

## **Electrical panel**

The electrical panel includes components capable of withstanding the thermal and dynamic stresses resulting from continual use over many years. It is protected against short-circuit currents by means of automatic circuit breakers on each of the power loads and it complies with the reference standard EN60204.

- control of the panel, therein included the wiring check and an electrical operating test.
- check of the applied voltage or check of the insulation resistance.
- check of the electrical continuity of the protection circuit.

The electrical panel is supplied complete with:

- main disconnecting switch of the machine.
- magnetothermic switches to protect the individual electrical users of modular type.
- transformer for auxiliaries (normally at 24V AC) with clamp for earthing connection.
- three-pole control contactors and auxiliary control relays.
- electronic regulator and relative accessories.
- plate for fastening the components.
- terminal board.
- cable raceway in flame-retardant plastic (PVC) with tight teeth.
- wiring with N07V-K stranded wire with a minimum section of 1 mm and supplied with ferrule.

## Microprocessor

The units are equipped with a microprocessor for the complete management of the precision air-conditioning units. The microprocessor also allows to manage a humidifier and the dehumidification with various presettable configurations.

Main functions:

- Temperature and humidity control of the intake air, limit on the delivery temperature (optional) and Autotuning function for the automatic determination of the best operating parameters.
  - Management of the dehumidification.
  - INVERTER compressor control.
  - Speed control of the delivery fan (optional): regulation based on the cooling capacity, constant pressure or fixed speed.
  - Complete management of the alarms, setting of the type of reset, delay and action on the alarm relays, setting of the digital input polarities of general external alarm, alarm history.
  - Rotation of several units, max distance 1 km, max baud rate 1 Mbit, max number of units managed in a network 12. Rotation for balancing the operating hours of the units, switch-on of the back-up units to compensate for any excessive thermal load (duty share) or following the occurrence of an alarm (timed rotation and alarm rotation). Harmonization of operation by auto-propagation of the setpoint.
  - Connection to serial line for supervision and remote support with optional RS485 Modbus slave.
  - Multilingual 12 languages available. The screen can display two languages (the first one set up by the factory, the second one chosen between the available and specified when ordering)
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- Navigation with textual language menus, with access on three password-protected levels of authorization.
  - Representation of the operating state with user-friendly icons.
  - Management of the second cold source (DUAL FLUID units).
  - Management of the second cold source (DUAL COIL units).

Controlled devices:

- 1, 2 or 3 compressors on 1 or 2 circuits respectively.
- Three-way valve for cooling coil.
- Dehumidification management.
- 1 or 2 heating elements or three-way valves for heating coil or hot gas.
- EC INVERTER supply fan.
- Humidifier with proportional output.
- Dehumidification with On-Off output.
- Relay alarm device.
- Remote condensers: up to 2 independent condensers, fan speed regulation based on temperature or pressure.

Options:

- RS485 serial interface
- Modules for fan speed control.
- Monitor for PC via Modbus
- NetSCADA management and monitoring interface with TCP/IP protocol over Ethernet or by GSM, GPRS or HSDPA telephone.
- Remote display for wall-mounted or recessed assembly.

Programming:

- All the machine parameters can be configured not only by means of the keypad located on the front of the unit, but also by PC or remote configurator.

## **Heating coil**

### **ELECTRICAL HEATING COIL**

Realized with finned electric stainless steel AISI 321 armoured resistances with safety thermostat with manual rearmament to inhibit the power supply and activate the alarm in case of superheating. The power is splitted on two steps and allows to obtain an excellent temperature regulation depending on the request of the ambient to control.

This heating system has a dual function:

- air heating to achieve the set-point speed condition;
- post-heating during the dehumidification phase, in order to take back the air temperature to set-point.

### **HOT WATER HEATING COIL WITH 3-WAY VALVE (OPTIONAL)**

This system is offered as an alternative to the electric heating system. It is made of a one-step coil with aluminium finned pack, equipped with self-distancing collars: beside guaranteeing a perfect spacing they ensure a perfect contact with the copper tube. The frame in galvanized steel with suitable thickness is developed over the entire perimeter of the coil in order to guarantee complete protection of the finned pack, copper bends and collectors.

The heating coil is equipped with 3-way modulating regulation valve with servo-motor controlled directly by the unit microprocessor.

This heating system has a dual function:

- air heating to achieve the set-point speed condition;
- post-heating during the dehumidification phase, in order to take back the air temperature to set-point.

### **HOT GAS POST-HEATING COIL WITH VALVE (OPTIONAL)**

This system is offered as an alternative to the electric heating system. It uses part of the heat transferred to the condenser to post-heat the air sent to the place to be cooled. It is made of a one-step coil with aluminium finned pack, equipped with self-distancing collars: beside guaranteeing a perfect spacing they ensure a perfect contact with the copper tube.

The frame in galvanized steel with suitable thickness is developed over the entire perimeter of the coil in order to guarantee complete protection of the finned pack, copper bends and collectors.

This system is activated during the dehumidifying phase. The heating coils are equipped with ON-OFF valve with servo-motor controlled directly by the unit microprocessor.

## **Electrodes steam humidifier**

Flooded-electrode model with sterile steam modulating production and boiler salt concentration automatic regulation to allow the use of non-treated water.

The humidifier is equipped with steam cylinder, generated steam distributor (installed directly downline of the cooling coil), water inlet and outlet valves and maximum level sensor. The proportional control of the humidifier operation guarantees system total efficiency, energy saving and components longer duration. On demand the steam cylinder can be inspectable to allow the electrodes periodic cleaning from limestone. The steam maximum production capacity is adjustable within a range of values that can be chosen manually.

## **Remote condensers**

Aircooled remote condensers for outdoor installation.

The line includes models to be joint with Close Control units; sizes have been combined to allow Close Control units to reach also an operational limit of 52°C of outside temperature. The remote condensers are available in the standard, silenced and super silenced versions.

### **Frame**

Pre-painted galvanised steel casework. The casing provides strength and robustness to avoid vibrations also due to the plant. The frame of the coils is designed to avoid any contacts between pipes and casing to guarantee the safety of the unit and long lifetime.

### **Supports**

Are made from AISI 304 stainless steel to guarantee long lifetime, and they can be used as lifting eyebolts. The feet on the horizontal version are longer, to guarantee even air intake into the coil, even when it is installed in areas with poor airflow. Stainless steel nuts and bolts have been used for the structural parts, and nylon ones for the sides.

### **Motorfans cowlings**

The pipes are made with a wide bending radius to eliminate any turbulence in the airflow. This means that fan efficiency is improved and sound pressure reduced with respect to normal cowlings with low nosepieces. The plenum of the unit has been increased to give even air distribution to the coil. All motors have external rotors, with IP54 protection level.

### **Heat exchanger**

This is made with corrugated fins with a greater external heat exchange surface, cut with a special louver configuration to give the best external coefficient of heat exchange. The pipes have special internal helicoidal scoring, diversely from normal smooth pipes, and give greater internal heat exchange coefficient and greater exchange surface. The fins are aluminium and the pipes are made of copper. The coil circuits guarantee correct drainage of liquid, in both horizontal and vertical positions.

### **Electrical panel**

Includes: master switch, thermal magnetic circuit breaker, contactor, fans wiring, terminals for external connections.

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OFFER - P-2020-11-078502		ITEM - SZPITAL ŻEROMSKIEGO PROJ.PROHUBUS
<b>GENERAL INFORMATION</b>		
Total cooling capacity	[kW]	13,4
Sensible power	[kW]	12,2
Total absorbed power	[kW]	12,9
Compressors absorbed power	[kW]	4,6
Refrigerant	Type	R410A
Compressors	Type	Inverter Scroll
Compressors / Refrigerant circuits	n°	1 / 1
Capacity steps	%	stepless
<b>ELECTRICAL DATA</b>		
Max power input unit	[kW]	9,8
Max input current unit	A	38,0
Inrush current unit	A	82,5
Supply voltage	V/Ph /Hz	400/3+N/50
<b>SOUND PRESSURE</b>		
Sound pressure level in free field at 2 m (ISO 3744)	db(A)	63,0
<b>AIR TREATMENT SECTION</b>		
Air discharge	Type	Top
Fans	n°	1
Air inlet temperature	[°C]	14,0
R.H.	%	30
Temperature outlet air	[°C]	7,3
Humidity output	%	46
Exchanger	Type	Finned coil
Air flow	[m³/s]	1,08
External static pressure	Pa	20÷130
Air filter	Type	M5
Nominal power consumption fan motor	[kW]	0,80
Nominal current consumption fan motor	A	1,50
<b>CONNECTIONS</b>		
Discharge line	ø mm	16
Liquid line	ø mm	12
Condensate dumping	ø mm	DN 20
<b>HUMIDIFIER</b>		
Steam capacity	kg/h	4
Max power input	[kW]	3,0
Fill/drain water connections	"G	3/4"F / 20 mm
<b>ELECTRICAL HEATING</b>		
Total power	[kW]	4,5
Current input	A	6,0
Capacity steps	n°	3,0

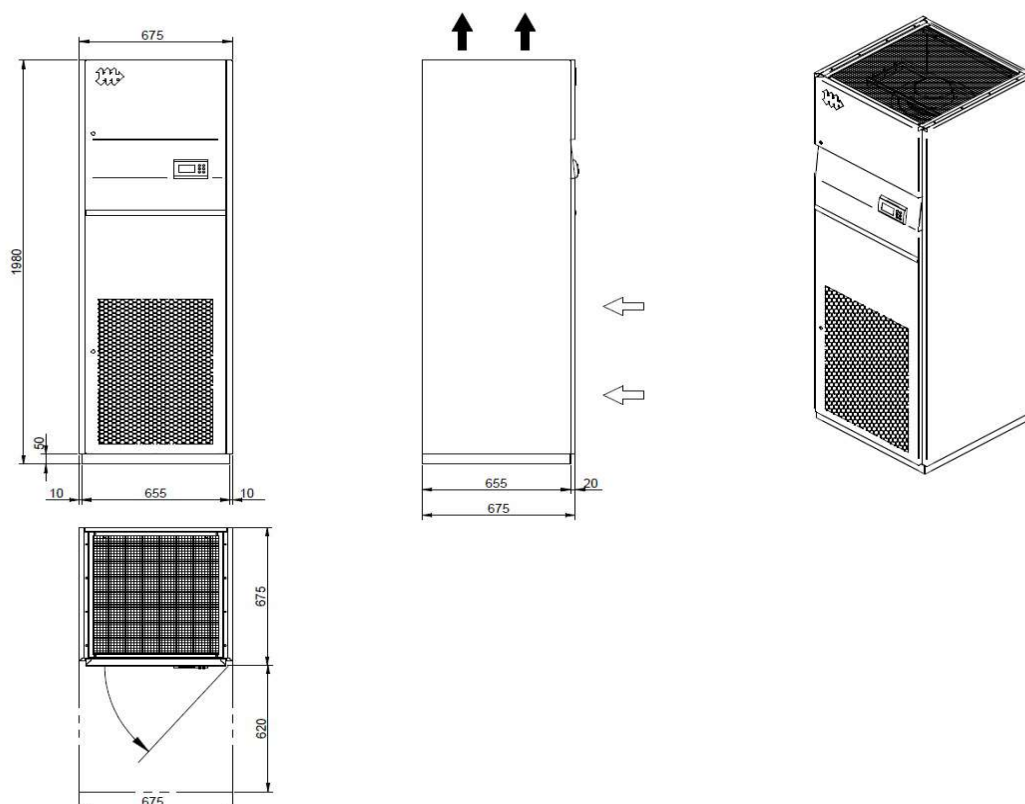
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<b>DIMENSIONS AND WEIGHT</b>		
Width x Lenght x Height	mm	675X675X1980
Weight	kg	242
<b>REMOTE CONDENSER</b>		
Exchanger	Type	Finned coil
Fans	n°	1
Ambient air temperature	[°C]	35
Air flow	[m³/s]	2
Sound pressure level in free field at 10 m ( ISO 3744 )	db(A)	46,0
Supply voltage	V/Ph/Hz	230/1/50
Power input	[kW]	0,68
Current input	A	3,00
<b>Connections</b>		
Discharge line	ø mm	18
Liquid line	ø mm	16
Width x Lenght x Height	mm	1200X860X1100
Weight	kg	91
Number remote condensers	n°	1



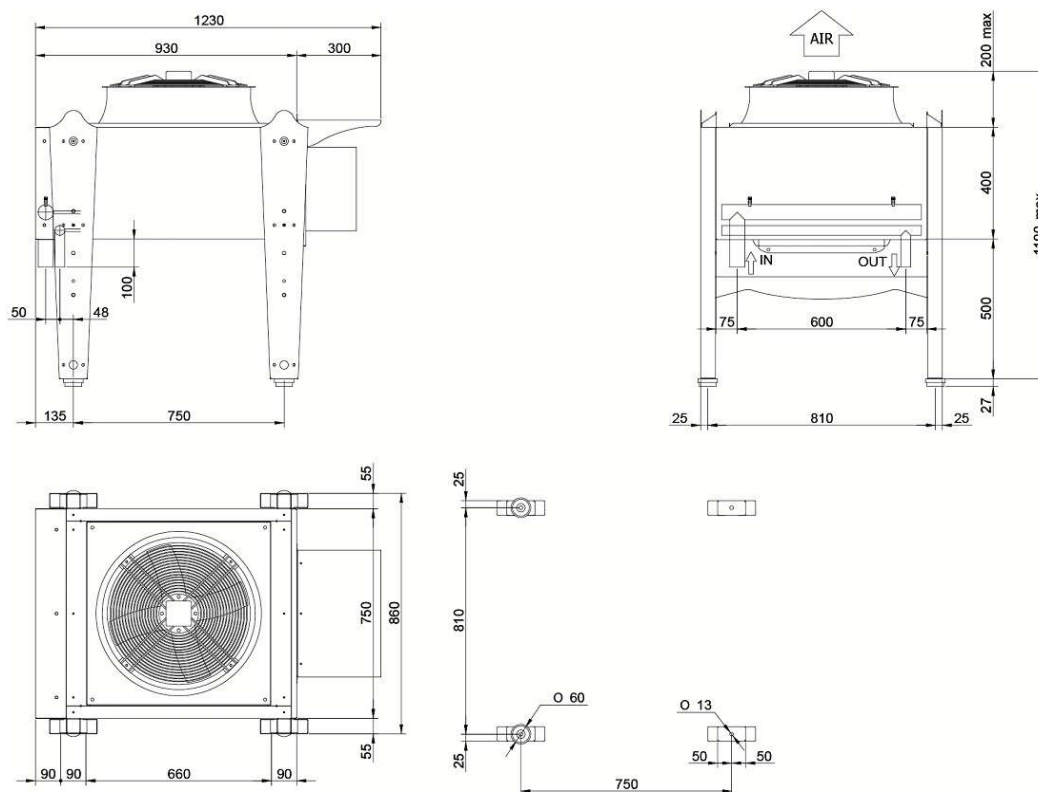
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**REMOTE CONDENSER**



**CLEARANCE AREA**

