fisair
air humidity control

INSTALLATION, OPERATION AND MAINTENANCE MANUAL FOR AIR DEHUMIDIFIER DESICCANT ROTOR TYPE DFRC-E SERIES

MUSC-0651E-EN-20-01

In fulfilment of the Regulations of the European Union on Machine Safety,
it is indispensable to read this manual in detail prior to installing the equipment.

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RC-0529/2015

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1. Introduction

Dear customer,

The FISAIR dehumidifier is our answer to today's technical requirements. It satisfies them by means of its operational safety, its operational comfort and its economic efficiency.

To be sure of operating your FISAIR Dehumidifier efficiently please read these Operation and
Maintenance Instructions.

Use the steam humidifier only in proper and safe conditions, paying attention to all notes in these instructions.

If you have any questions...please contact us:

Fisair S.L.
Tel.: (34) 91-6921514 Fax: (34) 91-6916456
E-mail address: info@fisair.com

Or your local dealer

1.1. Operating instructions

The correct use of the dehumidifier also includes adherence to our installation, dismantling, refitting, commissioning, operation and maintenance instruction as well as taking correct disposal steps.

Only qualified and authorised personnel may operate the unit. Persons transporting or working on the unit, must have read and understood the corresponding parts of the Operation and Maintenance Instruction and especially the chapter “Safety Notes“. Additionally, operating personnel must be informed of any possible dangers. You should place a copy of the Operation and Maintenance Instruction at the unit's operational location (or near the unit).

SPANISH:

FISAIR se exime de cualquier responsabilidad a menos que se cumplan con todas las instrucciones de instalación y funcionamiento proporcionadas por FISAIR, o si los productos han sido modificados o alterados sin el consentimiento por escrito de FISAIR, o si tales productos han sido sometidos a un mal uso, mala manipulación, alteración, mantenimiento inadecuado o muestran consecuencias de accidente o utilización negligente. Estas situaciones pueden ser una conexión de alimentación incorrecta, golpes con otros objetos, anulación de seguridades, etc.

ENGLISH:

FISAIR disclaims all liability:

- **unless all installation and operating instructions provided by FISAIR are complied with**
- **if the products have been modified or altered without the written consent of FISAIR**
- **if the products have been subjected to misuse, tampering, alteration, improper maintenance or show consequences of accident or negligent use such as an incorrect power connection, impacts from other objects, security override, etc.**

GERMAN:

FISAIR lehnt jegliche Verantwortung ab, wenn nicht alle von FISAIR zur Verfügung gestellten Montage- und Betriebsanleitungen eingehalten werden oder wenn die Produkte ohne schriftliche Zustimmung von FISAIR modifiziert oder verändert wurden oder wenn diese Produkte missbräuchlicher Verwendung, unsachgemäßer Handhabung, Veränderung, unsachgemäßer Wartung ausgesetzt waren oder Folgen von Unfall oder fahrlässiger Nutzung aufweisen. Dies kann unter anderem eine falsche Stromverbindung, Schläge mit anderen Objekten, das Entfernen von Sicherheits-/Schutzvorrichtungen usw. sein.

FRENCH:

FISAIR se dégage de toute responsabilité, sauf si toutes les consignes d'installation et de fonctionnement fournies par FISAIR ont été respectées, si les produits ont été modifiés ou altérés sans le consentement par écrit de FISAIR, ou si ces produits ont été soumis à une mauvaise utilisation, une mauvaise manipulation, une altération, une maintenance inadéquate ou s'ils montrent des traces d'un accident ou d'une utilisation négligente. Ces situations peuvent être une connexion d'alimentation incorrecte, de chocs avec d'autres objet, d'annulation de sécurités, etc.

2. Notas de seguridad/Safety Instructions/Sicherheitshinweise/Notes de sécurité

2.1. Spanish

Lea con detenimiento estas notas de seguridad y examine el equipo a fin de familiarizarse con él antes de instalarlo, ponerlo en marcha o realizar operaciones de mantenimiento. Los siguientes símbolos o mensajes pueden aparecer en el presente documento o en el equipo, advierten de posibles peligros o proporcionan información que pueden ayudarle a aclarar o simplificar un procedimiento.

Atención, Tensión

La presencia de este símbolo en una etiqueta de peligro o de advertencia indica que existe riesgo de electrocutarse, lo cual puede provocar lesiones corporales o puede poner en peligro su vida sino se respetan las instrucciones.

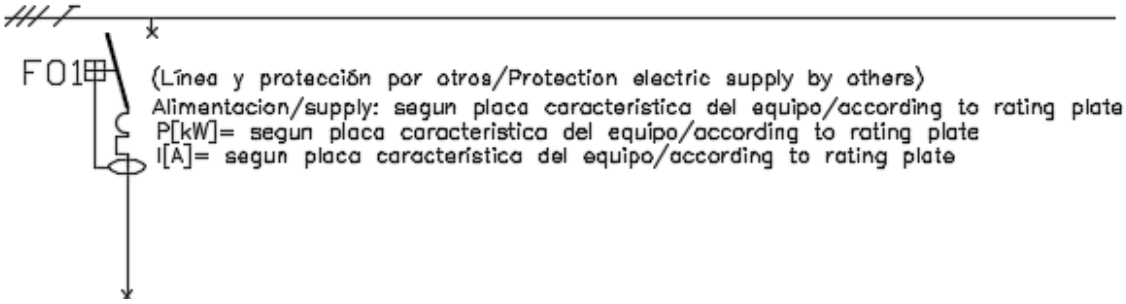
Atención

Este es el símbolo de una alerta de seguridad. Sirve para advertirle del peligro potencial de sufrir lesiones corporales.

Respete todas las indicaciones de seguridad que acompañan a dicho símbolo para evitar toda situación que pueda ocasionar lesiones y/o averías en la unidad.

instalación de interruptor diferencial en la línea de alimentación eléctrica.

El instalador tiene la obligación de montar un interruptor diferencial específico en la línea de alimentación eléctrica de la máquina.



Sobre el riesgo de incendio ante uso de materiales inadecuados

Existe el riesgo de incendio o explosión en el equipo ante la entrada de materiales combustibles o inflamables en estado sólido, liquido o gaseo (tanto en la entrada del aire de reactivación como la de proceso).
Ignorar estas instrucciones puede invalidar todas las garantías aplicables.

En general

- Si nota que algo funciona mal o detecta fallos en el suministro de energía eléctrica, apague la unidad inmediatamente y tome medidas para asegurarse de que no se va a poner en marcha de nuevo. Los fallos deben ser corregidos inmediatamente.
- Emplee personal debidamente cualificado para realizar los trabajos de reparación, garantizando así el funcionamiento seguro de la unidad.
- Utilice únicamente piezas de recambio originales FISAIR.
- Consulte cualquier normativa local que restrinja o regule la utilización de este deshumidificador.

Sobre el funcionamiento de la unidad

- No comprometa la seguridad de la unidad.
- Compruebe periódicamente los dispositivos de protección y aviso.
- El equipamiento de seguridad de la unidad no se debe eliminar o dejar fuera de servicio.

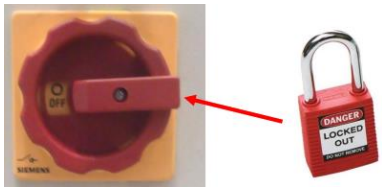
Sobre los componentes eléctricos

- Los trabajos que afectan a componentes eléctricos deben ser llevados a cabo por electricistas cualificados.
- Utilice únicamente fusibles de clase original y con la calibración correcta.
- Realice chequeos periódicos al equipo eléctrico.
- Los defectos, como conexiones flojas o cables quemados se deben reparar inmediatamente.

Sobre la Instalación, Desmontaje, Mantenimiento y Reparación de la unidad

- La máquina no deberá ser manipulada cuando se encuentre en funcionamiento.
- Apague la alimentación de la unidad cuando se realicen tareas de mantenimiento o reparaciones en la misma.
- No realice ampliaciones o instale equipamiento adicional en la unidad sin previa aprobación por escrito de FISAIR.

El interruptor seccionador I1 debe de colocarse en posición “0” y boqueado mediante un candado para acceder al plenum del ventilador y/o realizar cualquier acción de mantenimiento a bordo de la unidad.



Parada en situación de emergencia para evacuar calor residual

El equipo no dispone de parada de emergencia general en el cuadro de mandos para evitar un posible accidente por la no evacuación del calor residual en el flujo de reactivación. Para llevar a cabo la parada frente a una situación de inminente riesgo o accidente, utilice el interruptor seccionador I1 identificado en rojo y amarillo y póngalo en posición 0.
No se debe realizar para hacer la parada funcional del equipo en un uso normal.

2.2. English

Read these safety notes carefully and examine your equipment to familiarize yourself with it before installing, commissioning, or performing maintenance operations.
The following symbols or messages, which may appear in this document or on your computer, warn of potential hazards, or provide information that can help you clarify or simplify a procedure.

Attention

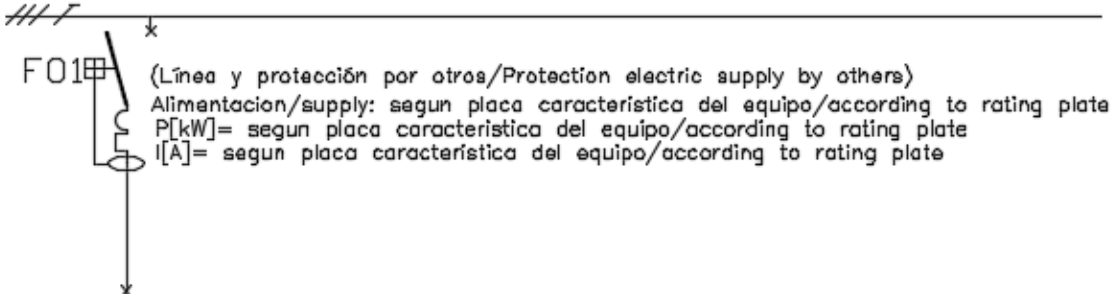
The presence of this symbol on a hazard or warning label indicates that there is a risk of electrocution, which may result in life threatening injury or death if the instructions are not respected.

Attention

This is the symbol of a security alert. It serves to warn you of the potential danger of bodily injury. Observe all safety instructions that accompany this symbol to avoid any situation that may cause injury and/or damage to the unit.

Fused Isolator installation and the power supply line.

The installer is required to mount a specific fused isolator on the machine's power supply.



Fire risk from the use of inappropriate materials

There is a risk of fire or explosion if any combustible or flammable materials in solid, liquid or gaseous state enter the equipment (at the inlet of the reactivation air or the process air). Ignoring these instructions will invalidate all applicable warranties.

General

- If you notice a malfunction or detect power failure, turn the unit off immediately and ensure it cannot start up again.
- Problems must be fixed immediately.
- Use properly qualified personnel to carry out repair work, thus ensuring the safe operation of the unit.
- Use only original FISAIR spare parts.
- Refer to any local regulations that restrict or regulate the use of this dehumidifier.

Operation of the unit

- Do not compromise the safety of the unit.
- Periodically check the protection and warning devices.
- The safety equipment of the unit must not be removed or left out of service.

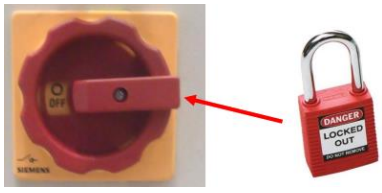
Electrical components

- Work affecting electrical components must be carried out by qualified electricians.
- Use only original class fuses with correct calibration.
- Perform regular checkups on the electrical equipment.
- Defects, such as loose connections or burnt cables, should be repaired immediately.

Installation, Disassembly, Maintenance and Repair of the Unit

- The machine must not be tampered with when in operation.
- Turn off power to the unit when maintenance or repairs are being performed.
- Do not upgrade or install additional equipment on the unit without prior written approval from FISAIR.

The I1 isolator switch must be placed in the "0" position and locked out with a padlock to access the fan plenum and/or perform any maintenance action within the unit.



Emergency stop to evacuate waste heat

The equipment does not have a general emergency stop on the control panel. This is to avoid a possible accident due to not removing waste heat in the reactivation flow. To stop in a situation of imminent risk or accident, use the I1 isolator identified in red and yellow and set it to position 0.
This should not be used to for a normal stop of the equipment.

2.3. German

Lesen Sie diese Sicherheitshinweise aufmerksam durch und prüfen Sie das Gerät, bevor Sie es installieren, in Betrieb nehmen oder Wartungsarbeiten durchführen.
Die folgenden Symbole oder Meldungen können in diesem Dokument oder auf dem Gerät erscheinen, vor möglichen Gefahren warnen oder Informationen bereitstellen, die zur Klärung oder Vereinfachung des Verfahrens beitragen können.

Vorsicht, Spannung

Das Vorhandensein dieses Symbols auf einem Gefahren- oder Warnschild weist auf das Risiko eines Stromschlags hin, der zu Körperverletzungen oder zu lebensgefährlichen Situationen führen kann, wenn die Anweisungen nicht befolgt werden.

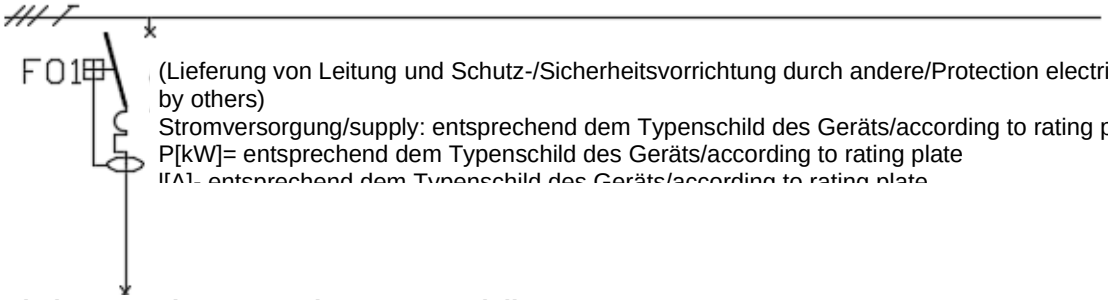
Achtung

Dies ist das Symbol eines Sicherheitsalarms. Das Symbol warnt Sie vor möglichen Verletzungsgefahren.

Beachten Sie alle Sicherheitshinweise zu diesem Symbol, um Situationen zu vermeiden, die Verletzungen und/oder Schäden am Gerät verursachen können.

Installation eines Differenzialschalters an der Stromversorgungsleitung.

Der Installateur ist verpflichtet, einen speziellen Differenzialschalter an der Stromversorgungsleitung des Geräts anzubringen.



(Lieferung von Leitung und Schutz-/Sicherheitsvorrichtung durch andere/Protection electric supply by others)
Stromversorgung/supply: entsprechend dem Typenschild des Geräts/according to rating plate
P[kW]= entsprechend dem Typenschild des Geräts/according to rating plate
I[A]= entsprechend dem Typenschild des Geräts/according to rating plate

Brandgefahr bei Verwendung ungeeigneter Materialien

Es besteht Brand- oder Explosionsgefahr im Gerät, wenn brennbare oder entflammbare Stoffe in festem, flüssigem oder gasförmigem Zustand (im Einlass von Reaktivierungsluft und Prozessluft) eintreten.
Durch die Nichteinhaltung dieser Anweisungen können alle geltenden Garantien ihre Gültigkeit verlieren.

Allgemeines

- Wenn Sie eine Fehlfunktion oder einen Stromausfall feststellen, schalten Sie das Gerät sofort aus und ergreifen Sie Maßnahmen, um sicherzustellen, dass es nicht wieder eingeschaltet wird. Fehler sind sofort zu beheben.
- Verwenden Sie nur Original-FISAIR-Ersatzteile.
- Um einen sicheren Betrieb des Geräts zu gewährleisten, dürfen Reparaturarbeiten nur von entsprechend qualifiziertem Personal durchgeführt werden.
- Beachten Sie lokale Vorschriften, die den Einsatz dieses Luftentfeuchters regeln bzw. einschränken.

Über den Betrieb des Geräts

- Tun Sie nichts, was die Sicherheit des Geräts gefährdet.
- Überprüfen Sie regelmäßig die Schutz- und Warnvorrichtungen.
- Die Sicherheitseinrichtung des Geräts darf nicht entfernt oder außer Betrieb genommen werden.

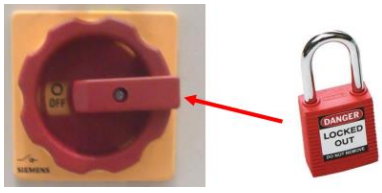
Über die elektrischen Komponenten

- Arbeiten an elektrischen Komponenten dürfen nur von Elektrofachkräften ausgeführt werden.
- Verwenden Sie nur korrekt kalibrierte Sicherungen der ursprünglichen Klasse.
- Führen Sie regelmäßige Kontrollen an den elektrischen Geräten durch.
- Defekte wie lose Verbindungen oder verbrannte Drähte müssen sofort repariert werden.

Installation, Demontage, Wartung und Reparatur des Geräts

- Während des Betriebs darf nicht an dem Gerät herumhantiert werden.
- Schalten Sie das Gerät aus, wenn Wartungsarbeiten oder Reparaturen am Gerät durchgeführt werden müssen.
- Nehmen Sie keine Erweiterungen vor und installieren Sie keine zusätzlichen Geräte ohne vorherige schriftliche Genehmigung von FISAIR.

Der Trennschalter I1 muss auf Position „0“ gestellt und mit einem Vorhängeschloss verriegelt werden, das den Zugang zum Plenum des Gebläses und/oder für jegliche Art von Wartungsarbeiten an dem Gerät absichert.



Notstopp zur Ableitung der Abwärme

Das Gerät verfügt nicht über eine allgemeine Notabschaltung auf der Schalttafel, um einen möglichen Unfall aufgrund einer Nichtableitung der Abwärme im Reaktivierungsstrom zu vermeiden. Für eine Abschaltung des Geräts im Falle einer unmittelbaren Gefahr oder eines Unfalls stellen Sie den rotgelben Trennschalter I1 auf Position 0. Eine solche Abschaltung darf nicht durchgeführt werden, um das Gerät bei Normalbetrieb abzuschalten.

2.4. French

Veuillez lire attentivement ces notes de sécurité et bien examiner l'appareil afin de vous familiariser avec lui avant son installation, sa mise en marche et les opérations de maintenance.
Les symboles ou messages suivants peuvent apparaître dans le présent document ou sur la machine, pour prévenir de dangers éventuels ou apporter des informations susceptibles de vous aider à mieux comprendre ou à simplifier une procédure.

Attention, Tension

La présence de ce symbole sur une étiquette de danger ou d'avertissement indique l'existence d'un risque d'électrocution, ce qui peut provoquer des blessures corporelles ou mettre en danger votre vie si les instructions ne sont pas respectées.

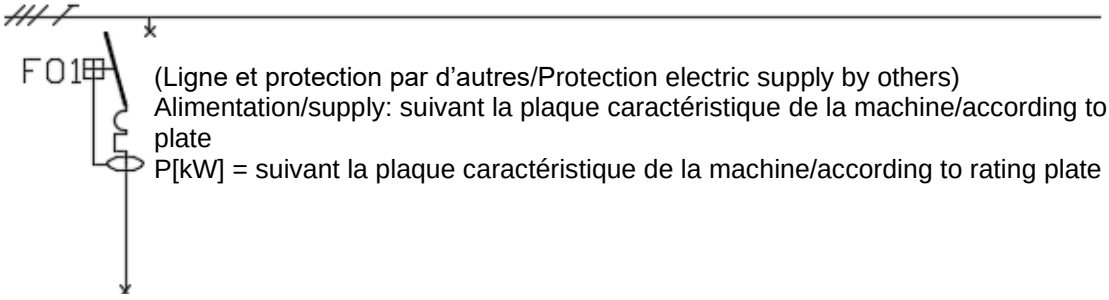
Attention

C'est le symbole d'une alerte de sécurité. Il vise à vous prévenir d'un danger potentiel de blessures corporelles.

Veuillez respecter toutes les indications de sécurité qui accompagnent ce symbole pour éviter toute situation pouvant entraîner des blessures et/ou des pannes de la machine.

Installation d'un interrupteur différentiel sur la ligne d'alimentation électrique.

L'installateur a l'obligation de monter un interrupteur différentiel spécifique sur la ligne d'alimentation électrique de la machine.



(Ligne et protection par d'autres/Protection electric supply by others)
Alimentation/supply: suivant la plaque caractéristique de la machine/according to rating plate
P[kW] = suivant la plaque caractéristique de la machine/according to rating plate

Concernant le risque d'incendie dû à l'utilisation de matériel inadéquat

Il existe un risque d'incendie ou d'explosion sur la machine en cas d'entrée de matériaux combustibles ou inflammables à l'état solide, liquide ou gazeux (au niveau de l'entrée de l'air de réactivation et de l'entrée de processus).
Le manquement à ces consignes peut invalider toutes les garanties en vigueur.

En général

- Si vous remarquez que quelque chose fonctionne mal ou si vous détectez des pannes au niveau de l'alimentation en énergie électrique, éteignez immédiatement la machine et prenez des mesures pour vous assurer que la machine ne va pas être remise en marche. Les pannes doivent être immédiatement corrigées.
- Utilisez uniquement des pièces de rechange originales FISAIR.
- Faites appel à du personnel dûment qualifié pour effectuer les travaux de réparation, pour garantir ainsi le fonctionnement sécurisé de la machine.
- Consultez la réglementation locale qui restreint ou régule l'utilisation de ce déshumidificateur.

Concernant le fonctionnement de la machine

- Veillez à la sécurité de la machine.
- Vérifiez régulièrement les dispositifs de protection et d'alerte.
- L'équipement de sécurité de la machine ne doit pas être éliminé ou mis hors service.

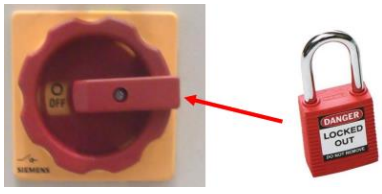
Concernant les composants électriques

- Les travaux qui affectent les composants électriques doivent être effectués par des électriciens qualifiés.
- Utilisez uniquement des fusibles de classe originale et de bon calibre.
- Révisez régulièrement l'équipement électrique.
- Les défauts, tels que les connexions distendues ou les câbles brûlés, doivent être réparés immédiatement.

Concernant l'installation, le démontage, la maintenance et la réparation de la machine

- La machine ne devra pas être manipulée lorsqu'elle fonctionne.
- Éteignez l'alimentation de la machine pendant les travaux de maintenance ou de réparation.
- N'effectuez pas d'agrandissement et n'installez pas d'équipement supplémentaire sur la machine sans l'accord préalable écrit de FISAIR.

L'interrupteur sectionneur I1 doit être placé sur la position « 0 » et bloqué avec un cadenas pour accéder au plenum du ventilateur et/ou réaliser n'importe quelle action de maintenance sur la machine.



Arrêt en situation d'urgence pour évacuer la chaleur résiduelle

L'équipement ne dispose pas d'arrêt d'urgence général sur le tableau de commandes afin d'éviter tout accident dû à la non-évacuation de la chaleur résiduelle dans le flux de réactivation. Pour arrêter la machine en cas de situation de danger ou d'accident imminent, utilisez l'interrupteur sectionneur I1 marqué en rouge et jaune et mettez-le sur la position 0.

Cette manœuvre ne doit pas servir à l'arrêt fonctionnel de la machine lors d'une utilisation normale.

3. Transport

3.1. General

Attention: Transport the air dehumidifier carefully. Prevent damage from careless loading and unloading and avoid the use of unnecessary force.

Attention: When lifting the air dehumidifier, always use a pallet truck or forklift.

3.2. Packing

Note: Observe the pictograms displayed on the carton.

3.3. Interim storage

During storage, keep the unit dry and protected from frost.

3.4. Check for complete and correct delivery of goods

Upon receipt of the unit, make sure that:

- Type and serial number on the name plate correspond to the order and supply information.
- Equipment is complete and in perfect condition.

Note: Immediately file a written claim with your shipping agent in case of transport damage or missing parts.

4. Rating plate

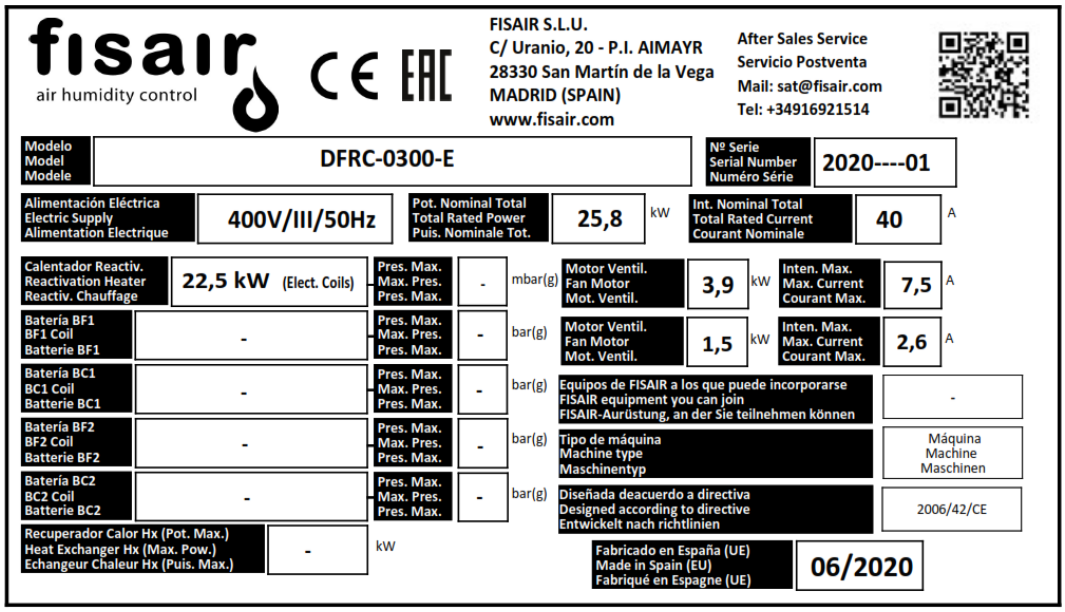
The rating plates provide essential information about the technical features of the machine.

The EC Machinery Safety Regulation requires all machinery operated within the European Economic Community to have a rating plate indicating its main features, the machine serial number and the manufacturer's name displayed in a durable manner.

The DFRC series has two types of plate:

- The larger main plate is located on the outside of the electrical panel housing for the basic unit, near the circuit breaker. It states:
    - Equipment model
    - Serial number
    - Electrical power connection
    - Nominal power for the equipment
    - Nominal current for the equipment.
    - Reactivation heater type and power.
    - Reactivation heater maximum pressure (if applicable).
    - Pre-cooling battery BF1 fluid and temperature (if applicable).
    - Pre-cooling battery BF1 maximum pressure (if applicable).
    - Pre-heating battery BC1 fluid and temperature (if applicable).
    - Pre-heating battery BC1 maximum pressure (if applicable).
    - Post-cooling battery BF2 fluid and temperature (if applicable).
    - Post-cooling battery BF2 maximum pressure (if applicable).
    - Post-heating battery BC2 fluid and temperature (if applicable).
    - Post-heating battery BC2 maximum pressure (if applicable).
    - Heat recovery maximum power (if applicable).
    - Dry air fan motor, maximum power and current.
    - Reactivation fan motor, maximum power and current.
    - Place and date of manufacture.
    - Machine type.
    - According to which directive is designed.
    - To which FISAIR machines can be join (if applicable)

- The smaller plate is inside the electrical panel and contains the most relevant electrical information:
    - Equipment model
    - Serial number
    - Electrical power connection
    - Nominal power for the equipment
    - Nominal current for the equipment.
    - Electrical wiring number
    - Name of the PLR configuration program (Programmable Logic Relay)
    - Place and date of manufacture
    - Machine type.
    - According to which directive is designed.
    - To which FISAIR machines can be join (if applicable)



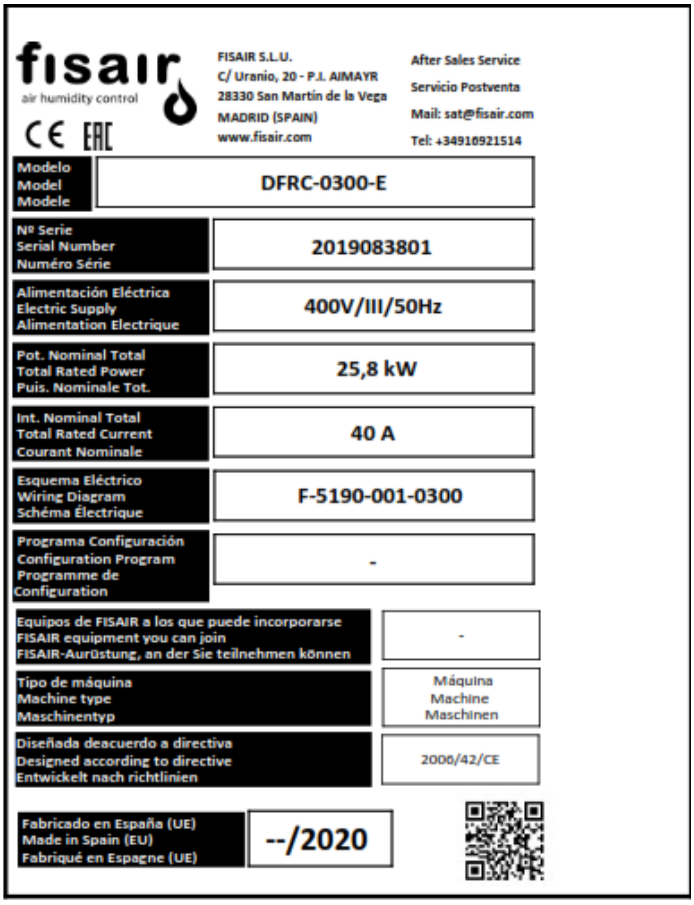
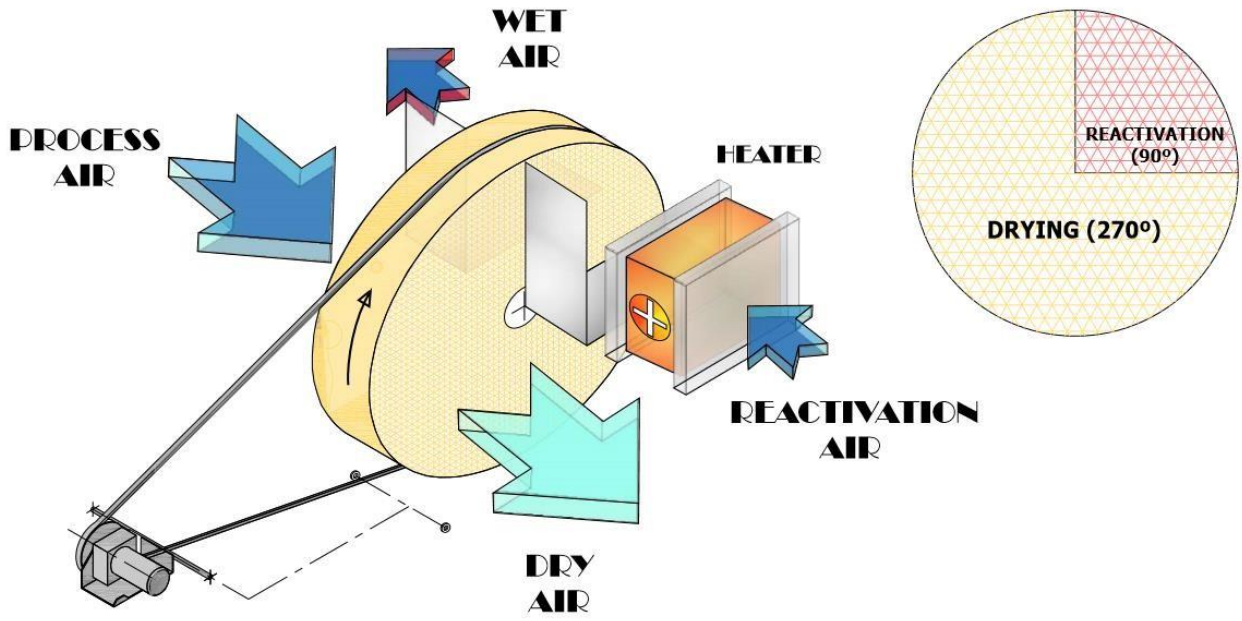


Figure 2: Example of a DFRC series rating plates

5. General description



5.1. Background

Modern standards concerning human comfort and the environmental requirements for manufacturing, storage & preservation of products and materials, make increasing demands on the control of moisture content in the working environment.

Where the natural or treated environment have an ambient condition holding more water vapor than the specified or desirable conditions, it is necessary to integrate equipment which can reduce humidity to the desired level.

FISAIR ROTARY DESICCANT DEHUMIDIFIER provide the solution.

The FISAIR dehumidifier is simple to install, reliable in operation and will provide long lasting humidity control at a reasonable running cost.

5.2. The desiccant wheel. Operating principle

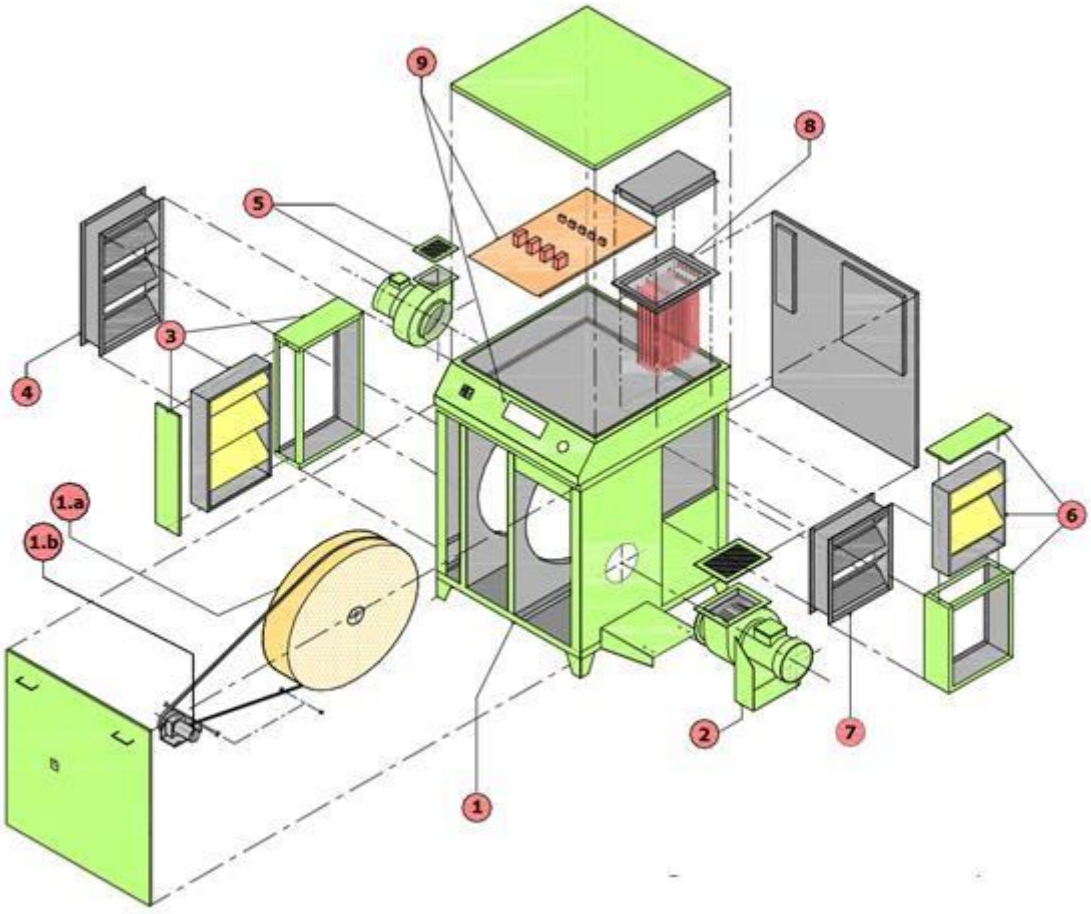
FISAIR series DFRC dehumidifiers operate on the adsorption property of a desiccant synthesized activated silica gel manufactured into a cylindrical wheel shape with multiple axial channels.

The face of the cylinder is divided in two zones, one is for the process air and the other for a heated auxiliary air stream to reactivate the desiccant. Thus a large surface area is presented to the air streams ensuring that a rapid drying process takes place.

The process air section occupies 75% or 270 degrees of the face. In this section the desiccant removes moisture from the process air passing through the rotating desiccant cylinder. The reactivation air, using a pre-heater, passes counter flow through the remaining 90 degrees section of the rotating cylinder, removing moisture from the desiccant to prepare it for the drying cycle once again.

A gear motor via a pulley and driving belt rotates the cylinder at low speed to provide a continuous and uniform operation. Air seals separate the two sections and prevent air loss at the perimeter of the rotor to ensure maximum performance.

5.3. Dehumidifier main components identification



The FISAIR series DFRC dehumidifiers consist of the following main components.

(1) Housing module, manufactured in galvanised steel sheet with a phosphate primer coat and an enamel finish. Internally the casing is arranged to provide two separate air streams for process/dry air and regeneration/wet air with tight seals. The module is easily accessed to ensure simple inspections and maintenance of the unit. Inside is:

(1.a) A desiccant rotor on a horizontal axis, the shaft is fixed and the wheel rotates on its hub.

(1.b) The driving geared motor with a pulley and a peripheral belt driving the rotor.

(2) Dry/Process air fan, centrifugal single entry with forward curved blades. Direct motor driven.

(3) Process air filter G4 standard.

(4) Aluminium process air flow control damper located at the air intake.

(5) Wet air/regeneration fan, centrifugal, single entry with forward curved blades, direct motor driven.

(6) Regeneration air filter G4 standard.

(7) Aluminium regeneration air flow control damper located at the air intake.

(8) Reactivation air heater (inside of main module for electrically regenerated models up to 63 kW. power).

(9) Electric control and protection box with simple function switches.

5.4. Options and ancillary components

On demand, DFRC series of FISAIR Dehumidifiers can be provided with:

- Stainless steel casings.
- High pressure Fans (up to 600 mm WC available).
- Backwards curved blades fans.
- Fans with stainless steel impellers/casings.
- Pulley/Belt driven fans.
- More efficient air filters (up to F9).

5.5. Regulation and control

Desiccant rotor dehumidifier drying capacity can be regulated by acting on:

- Reactivation heater power (lower power = lower drying capacity).
- Reactivation air flow (lower air flow = lower drying capacity).

When you select the unit you have to define regulation, so that it is not a matter of this manual to extend in this aspect, but only to give an idea about possible alternatives.

Note: As standard, FISAIR dehumidifiers are supplied with a hygrostat connection for On/Off operation.

For electrically regenerated models, control of heater and the total unit is supplied
(bridges H1, H2 or H3 of wiring diagram).

6. Installation

6.1. Locating the unit

Before installing FISAIR dehumidifiers the following points should be considered.

- If the dehumidifier has to be stored for a significant period prior to installation it should be protected from external damage and dust and construction material. In the case of outdoor storage, weatherproof covers should be employed.

- Once final location is defined ensure that there is enough space for servicing to be carried out. Take care to ensure that ducting connections are made without stressing the unit.

Attention: The maximum temperature and humidity conditions in the area where you will install the machine, must not exceed 40ºC and 50% R.H.

Attention: The standard FISAIR DFRC dehumidifier is designed for indoor and outdoor installation.

6.2. Service areas

Since the DFRC series dehumidifiers are designed to work in a temporary location, they must be located in such a way that access to the control panel, filters and the desiccant rotor lid are not blocked during use.

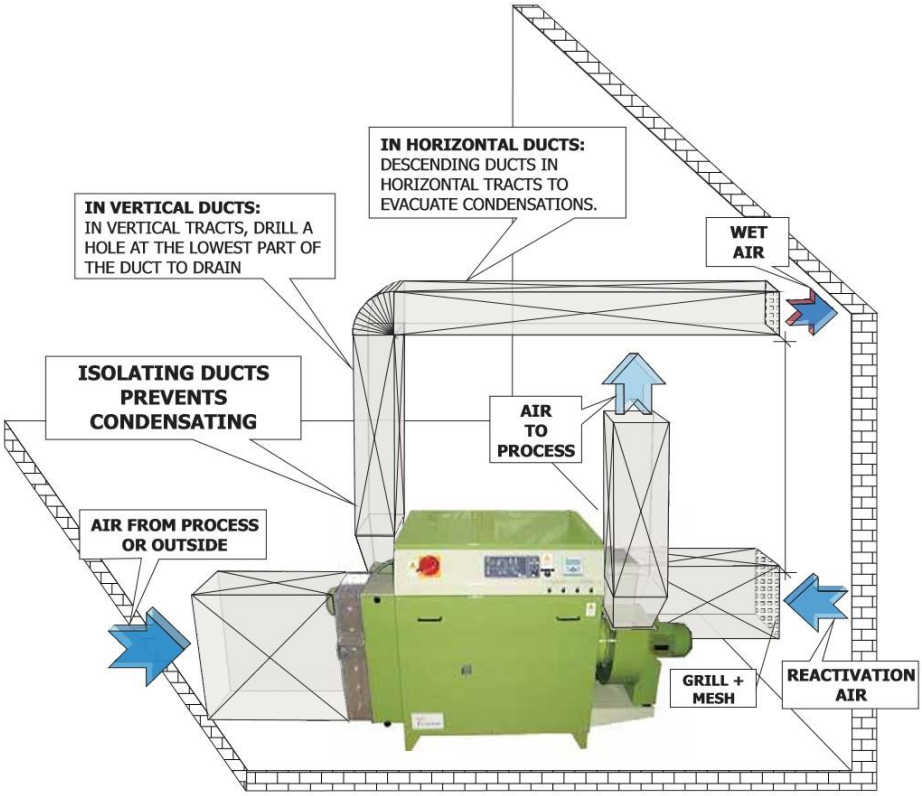
- Air filters must be cleaned or changed.

- The desiccant wheel faces should be inspected and cleaned and the air seals adjusted as necessary.

- Driving belt should be checked for fatigue and its tightness checked.

Note: In the case of the motor or belt failure they should be replaced. To do this dismount the front door which will provide space for dismounting the desiccant wheel driving device.

6.3. Air duct connections



- Check the operation of fans and motors and the reactivation heater. In case of failure, repair or replace.

- Check the components in the control box, service or change as necessary.

Duct connections should be made using normal industry standards for air transmission systems. However, the following particular items should considered:

- Make sure that available external pressures stated in the unit data-sheet have been considered when designing the ducts sizes and layout, allowing that the dehumidifier will operate with the nominal air flows.

- The FISAIR dehumidifier is normally delivered with air dampers in both air streams, in order to adjust the flows to the nominal values.

- The outdoor air intakes must be designed with grilles/wire meshes to avoid the involuntary carryover of raindrops, leaves, insects, etc. that could affect the correct unit operation.

- The wet air outlet (normally saturated air) must be placed as far as possible from the air intakes, to avoid losses of performance.

- Also, the wet air duct must facilitate the draining of the condensing water produced when this air becomes cooler due to heat transmission. To achieve this the duct must slope downstream and, if possible, be insulated. When this duct runs vertically upwards, a small hole drilled (5 mm. approx.) should be arranged at the lowest part of the duct to drain the condensate that could go back to the unit or block the air duct.

6.4. Electric mains connections

Attention, Voltage: The dehumidifier works with medium electrical power and voltage and its connection to the mains must be done by qualified personnel and according to the applicable local electrical regulations.

The unit must be connected to the electrical network of the installation through a short circuiting and ground leakage protection line, with wires section/sensitivity as corresponds to the dehumidifier power. The unit has a terminal block into the electric box sized according to the electrical standards, to connect the supply wires.

7. Start up

IMPORTANT Request start-up of your units by contacting:

sat@fisair.com o service@fisair.com

https://fisair.com/es/servicio/puestas-en-marcha/ (application in Spanish)

https://fisair.com/service/start-ups/ (application in English)

Once the ductwork has been completed. You have to connect to the electrical mains as show in the wiring diagram included into the electrical cabinet.

7.1. Unit start up

Attention, Voltage: Before using the control panel, verify that all mechanical elements can work freely and the unit has no installation debris inside.

- Check that hygrostat set point is demanding the equipment operation (this figure should be at least 10% - 15% lower than environmental humidity), or its terminals have a bridge.

- Check that the air flow regulation dampers are at least 50% opened.

- Make sure that all screwed electrical terminals into the electric control box are rightly tightened to avoid faulty connections. Then, turn on the isolator switch and check that the power lamp is on. (REMARK: Do not use the isolator switch to operate the unit).

- Check that the phases are connected in the correct order = fan motors and gear-motor are rotating in the right direction. To do it, switch on the equipment for a few seconds by the control switch.

- If fans/gear-motor do not rotate in the correct direction, change the phases order at the equipment supply. **Note:** It is not necessary from model DFRC 1100 due to –I3- selector, which is a turning inverter.

- Start unit again

Note: It is advisable to check the electric consumption of the main elements and to verify that they correspond to the nominal values.

- Adjust the air flows if necessary.

Note: The nominal reactivation air flow with standard heater will heat this air stream 100ºC (approx.) above the inlet temperature. So, you can use the thermometer reading to roughly adjust the reactivation air flow.

- After working for enough time to reach its standard operation (at least 30 minutes), make suitable thermo-hygrometric measurements.

7.2. Stopping the unit

To stop the dehumidifier after a period of operation for any length of time, use the selector I2 to set it to -0-.

Attention: You must not use the selector -I1- in any case to stop the operation, it is necessary that the power supply is present for at least 5 minutes after the stop order by I2, in this way, the fans continue to operate in order to dissipate the heat produced by the thermal inertia of the reactivation resistances.

7.3. Security and control components

Apart from the usual electrical components protections (against shortcuts and overload at the motors, with manual reset) the electrical panel of the dehumidifier is counting with the following security and control components:

- A temperature sensor in the reactivation side to read in the thermometer located in the control panel and thus to regulate the functional temperature within the operative limits.

- A safety switch to cut the power of the electric heater in case of over temperature due to the lack of reactivation air flow.

8. Maintenance

IMPORTANT Request maintenance of your units by contacting:

sat@fisair.com o service@fisair.com

https://fisair.com/es/servicio/mantenimientos/ (application in Spanish)

https://fisair.com/service/maintenance/ (application in English)

8.1. eventative maintenance

The following service schedule can be used.

OPERATION	FREQUENCY
Filters cleaning	Weekly
Rotor driving check	Weekly
Fan impellers inspection	Monthly
Inner inspection (desiccant rotor surfaces) driving belt tension and absence of unexpected materials	Every second month
Electrical consumption and terminals tightening	Every second month
General cleaning	Yearly

8.2. Corrective maintenance

The (desiccant rotor type) FISAIR dehumidifiers' series DFRC have a very simple design and their components should have very few problems.

The fans/motors are of standard manufacture and in case of electrical or mechanical damages any skilled serviceman may do the repairing. The heaters can be easily changed or serviced when necessary (normally after a very long working period) like any other conventional air heater element.

Also, minor components like filters, dampers, driving belt and electric box components could be replaced after their useful life and the user will have to define the necessity of storing these parts, depending on their availability through local dealers.

8.3. Desiccant wheel service

This is the only dehumidifier component that needs any special attention.

Concerning the mechanical operation, the rotor should not require attention for a very long time. Its rotation speed is so low (20 - 24 r.p.h) that the bearings and desiccant material housing cannot suffer any mechanical damage normally. However, it is very important to verify periodically the correct operation of the driving device because it directly affects the drying process.

Regarding the water vapor adsorption process, the main rotor component, activated silica gel, works by fixing the water vapor molecules in its micro pores in the process air stream Passes through the rotor channels.

This process is not affected by the normal environmental air conditions, nor by accidents of the installation that can be expected (for example, water direct action on the rotor does not affect the material, which is also fireproof).

Usual dust deposits on rotor surfaces can be removed by vacuum or blowing as well as by washing (please contact your dealer for written method when needed).

8.4. Washing procedure desiccant rotor

The desiccant rotor that include FISAIR air dehumidifiers has the advantage over the desiccant rotor type that it can be washed with water.

Normally, ordinary dust particles are removed with a vacuum cleaner as necessary. The cleaning frequency depends on the type of installation and the working cycles.

In the cases that vacuum cleaning is not enough to remove dirt and dust, it is possible to clean the rotor with water, using the following steps:

1) Remove the rotor from the dehumidifier. Remove the shaft and bearings, to be incorporated again after washing.

2) Prepare water in a container large enough to immerse the rotor, and to place the rotor so that it can be submerged in vertical position.

3) Immerse / remove the rotor from the tank of water two or three times, wait till the water drains from the rotor and the dissolved products in it are removed.

4) Once the process is complete, blow the rotor channels with compressed air to drag the remaining water.

5) Replace the rotor in the dehumidifier setting its axis and sealing gaskets.

6) Turn the rotor and the wet air fan on for about 30 minutes.

7) Connect the reactivation heater to finish the drying process.

Estimated time for washing procedure by model			
From **075** to **0300**	From **0400** to **0900**	From **1100** to **2100**	From **2900** to **3500**
6 hours	8 hours	12 hours	16 hours

9. Fault finding

If any fault happens, shut off immediately the unit through the I2 selector switch. Faults must be solved for qualified people only, following the security rules.

10. General technical data sheet

10.1. **Nominal** performances

Data for:
Process and reactivation air inlet at [T = 20ºC and R.H = 60%] Reactivation air flow = 0, 3 x Process air flow (Vp).
(For other conditions, please ask to FISAIR S.L)

DFRC-E MODEL	Vp (m3/h)	Pr (kW)	x (g/kg)	t (ºC)	W (kg/h)
0175	1200	13,5	6,3	23,5	9,1
0200	1400	15,8	6,2	22,5	10,4
0230	1600	18,0	6,1	22,0	11,7
0300	2100	22,5	5,7	20,0	14,3
0400	2700	27,0	5,8	21,0	18,8
0500	3600	36,0	5,7	19,5	24,6
0650	4500	45,0	5,5	18,0	29,7
0900	6000	63,0	5,7	20,0	41,0
1100	7500	81,0	5,8	19,0	52,2
1300	9000	99,0	6,0	21,0	64,8
1700	12000	126,0	5,9	22,0	85,0
2100	15000	162,0	5,9	21,0	106,2
2900	20000	200,0	5,7	21,0	136,8
3500	24000	240,0	5,6	20,0	161,2

Vp = Process air flow
Pr = Reactivation heater power
x = Specific capacity
t = Dry air temperature rise
W = Drying capacity

For quick estimation see next table.

Adsorption capacity change with different air inlet conditions (*)

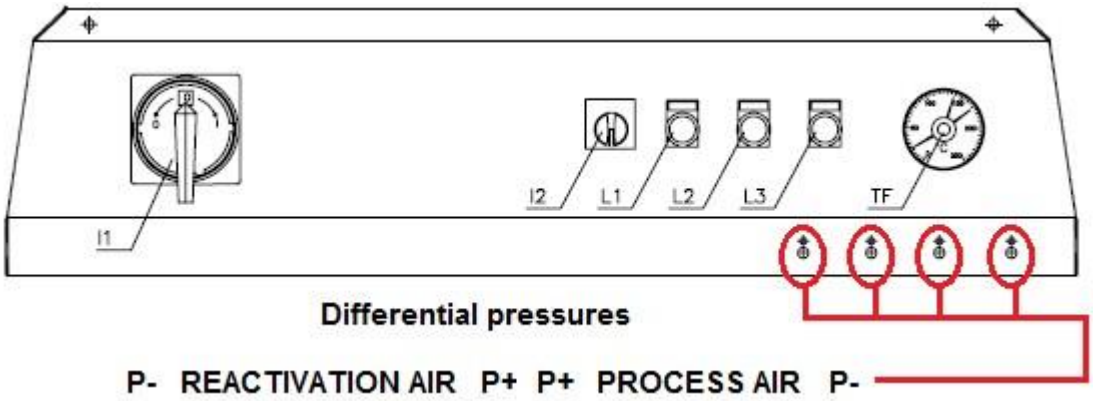
Correction coefficient percentage (%) to be applied to the drying capacity (*)

T (ºC) R.H (%)	5	10	15	20	25	30	35
40	25	38	57	73	90	105	110
50	35	46	70	87	105	120	125
60	40	60	78	100	120	125	135
70	50	68	90	110	130	135	145
80	56	75	95	120	135	140	-
95	62	80	105	130	140	145	-

* Approximate data used for quick capacity estimates; to be confirmed in each case.

Practical example: Starting with a DFRC-0300-E with 14, 3 kg/h (at 20ºC and 60% R.H), we want to know the capacity if the air being handled is at 30ºC and 70% R.H. The table show us that a Correction Coefficient of 135% must be applied, which gives a new capacity of 14, 3 x 1, 35 = 19, 3 kg/h (at 30ºC and 70% R.H).

10.2. Pressure drop to adjust nominal flow



(*) To adjust the process air flow and the reactivation air flow, it´s necessary to measure the differential pressure loss in the desiccant rotor with a manometer. Set the pressure drop on air process and on air reactivation with the parameters of the next table by opening and closing the respective dampers.

Example: (*) For a DFRC-0300-E you'll have to measure with the manometer 292 Pa in the process air to have 2100 m3/h. You'll have to measure 372 Pa in the reactivation air to have 630 m3/h

DFRC-E MODEL	Process air flow (m3/h)	Pressure drop of process air (Pa)	Reactivation air flow (m3/h)	Pressure drop of reactivation air (Pa)
0175	1200	141	360	192
0200	1400	167	420	225
0230	1600	200	480	261
0300	2100	292	630	372
0400	2700	158	810	213
0500	3600	228	1080	296
0650	4500	167	1350	223
0900	6000	243	1800	314
1100	7500	177	2250	236
1300	9000	225	2700	293
1700	12000	179	3600	238
2100	15000	242	4500	313
2900	20000	184	6000	244
3500	24000	235	7200	305

(*) Process and Reactivation air inlet: T = 20ºC and R.H = 60%.

10.3. Operational limits and conditions

10.4. Chemical resistance for silica gel rotor wheel

Attention: The following chemical compounds will cause the damage to SILICAGEL ROTOR WHEEL or decrease the dehumidification performance.

Note: If you operate the FISAIR DFRC dehumidifier under this chemical compounds, the warranty will become void.

INORGANIC COMPOUNDS

	COMPOUND	FORMULA	PHENOMENON
1	Lithium Chloride	LiCl	Clog silica gel pore by absorption
2	Sodium Hydroxide	NaOH	Dissolve silica gel
3	Potassium Hydroxide	KOH	Dissolve silica gel
4	Sodium Chloride	NaCl	Decrease of silica gel performance
5	Potassium Chloride	KCl	Decrease of silica gel performance
6	Calcium Chloride	$CaCl_2$	Decrease of silica gel performance
7	Magnesium Chloride	$MgCl_2$	Decrease of silica gel performance
8	Ammonia	NH_3	Basic gas
9	Hydrogen Fluoride	HF	Fluoride
10	Aluminium Chloride	$AlCl_3$	Decrease of silica gel performance
11	Sea Water	--	Decrease of silica gel performance
12	Steam at high temp.	--	Dissolve silica gel
13	Plasticizer	--	Clog silica gel pore
14	Strong Acid	pH= 2-3 and less	Decrease of ceramic mechanical property

ORGANIC COMPOUNDS

Please note that you have to be careful of the following volatile organic compounds which have high boiling temperature and low vapour pressure. Once silica gel adsorbed those volatile compounds, it does not release them. That means silica gel does not work for moisture removal.

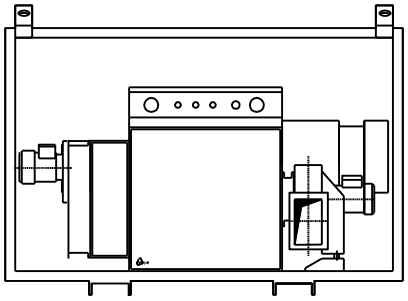
	COMPOUND	FORMULA	PHENOMENON
1	Oil Mist	--	Clog silica gel pore
2	Cyclohexanone	$C_6H_{10}O$	Decrease of silica gel performance
3	Isopropyl Alcohol	$(CH_3)_2CHOH$	Decrease of silica gel performance
4	o-Xylene	--	Decrease of silica gel performance
5	m-Xylene	$C_6H_4(CH_2)_2$	Decrease of silica gel performance
6	p-Xylene		Decrease of silica gel performance
7	Phenol	C_6H_5OH	Decrease of silica gel performance
8	o-Dicholorobenzene	$C_6H_4CL_2$	Decrease of silica gel performance
9	Methyl Bromide	CH_3Br	Decrease of silica gel performance

fisair
air humidity control

AIR HUMIDITY CONTROL

AIR DEHUMIDIFIERS SERIES DFRC

Compact and self-supporting air dehumidifiers with protective frame and roof for movable or temporary applications.

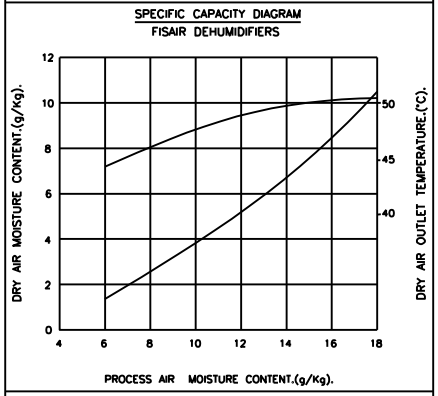


TECHNICAL DATA

MODEL	DRY AIR FLOW 3/	ELECTRICAL POWER W	NOMINAL DRYING CAPACITY (J l /) ( )
DFRC-0175	1200	15	7 2
DFRC-0300	2100	25 5	12 6
DFRC 0 00	2700	30	16 2
DFRC-0500	3600	39	21 6
DFRC-0650	500	51	27
DFRC-0651	5000	60	30
DFRC-0900	6000	73	36
DFRC-1100	7500	89	5
DFRC-1300	9000	100	5
DFRC-1700	12000	1 1	72
DFRC-2100	15000	183	90

(*)With a specific adsorption of 5 g.water/Kg air.

CAPACITY DIAGRAM.(*)



SETTLED PARAMETERS.

- PROCESS AIR TEMPERATURE : 25°C
- REACTIVATION AIR TEMPERATURE : 140°C
- EQUAL PROCESS/REACTIVATION AIR MOISTURE CONTENT.

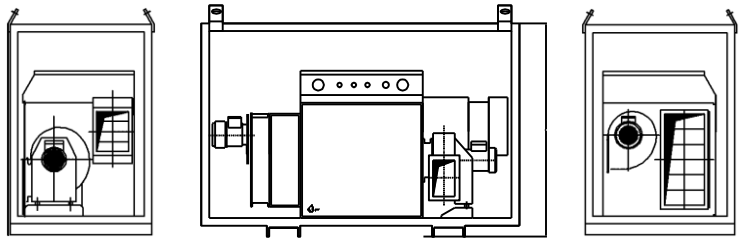
(*)Capacity diagram for DFRC-1100 model,with the specified settled parameters.Other models capacities to be furnished under demand.

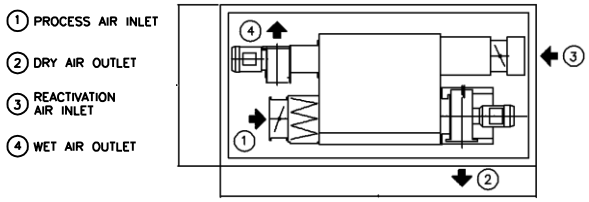
01/00 F-00596-02/E

FISAIR AIR DEHUMIDIFIERS.

SPECIFICATION :

Air dehumidifier by silicagel desiccant rotor,brand FISAIR,model DFRC-0000-E Manufactured in a self - supporting and compact unit with protective frame and roof made of steel tube/plate. Complete with fans,air filters,dampers for airflows regulation,reactivation air heater and electric control box for outdoors application. Performances and power requirements as stated into front table.





Main dimensions,mm.

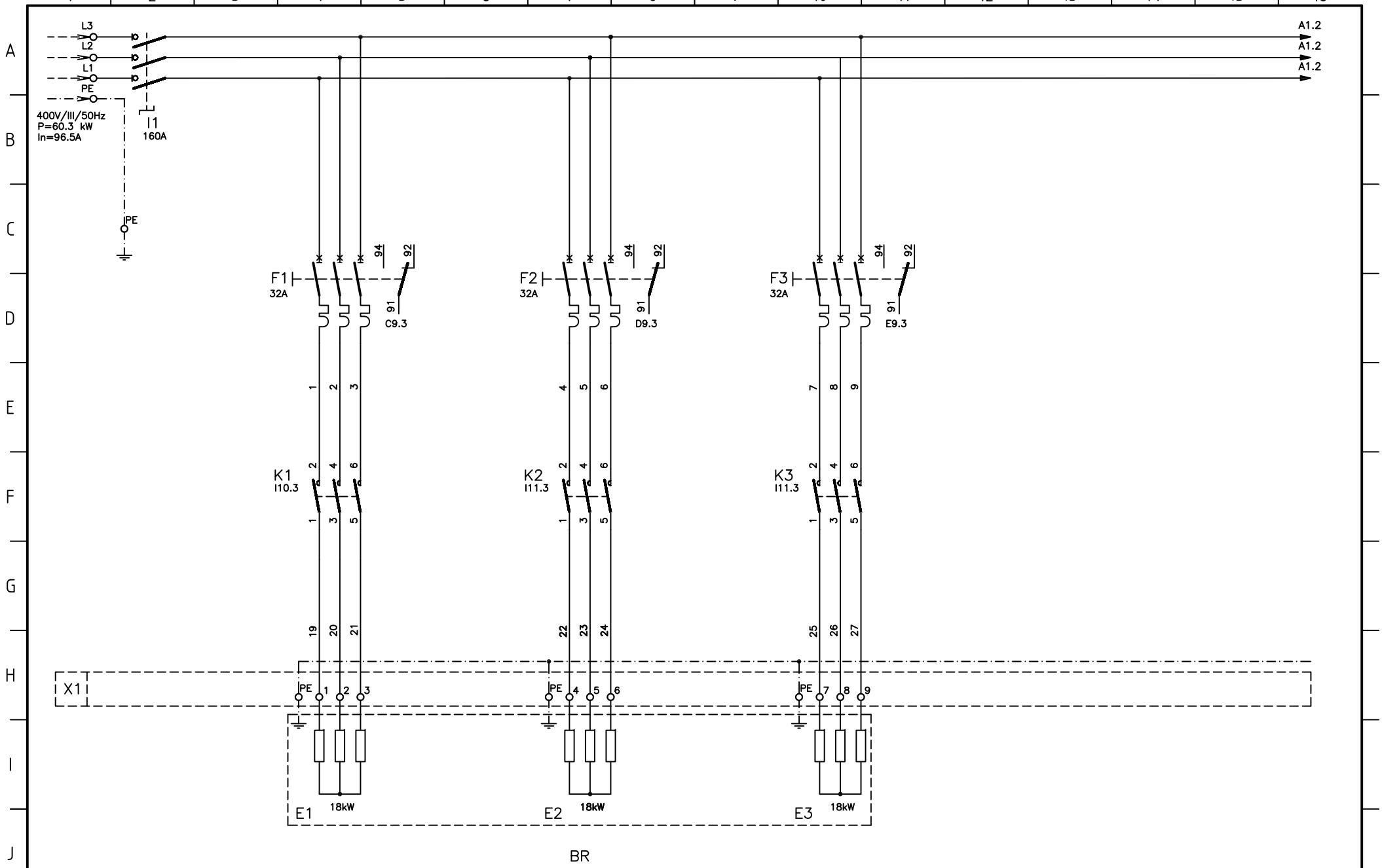
POS.	MODEL DFRC	CODE	A	B	C	AIR INLET FLANGES (L X H) 1	AIR INLET FLANGES (L X H) 3	AIR OUTLET FLANGES (L X H) 2	AIR OUTLET FLANGES (L X H) 4	APROXIMATIVE WEIGHT (Kg)
01	0175	70200020	2000	950	1215	250X614	250X314	115X140	103X125	285
02	0300	70200012	2000	950	1215	250X614	250X314	140X216	130X160	300
03	0400	70200021	2000	1100	1415	350X614	350X414	*140X216*	115X146	350
04	0500	70200022	2000	1100	1415	350X614	350X414	200X320	130X160	400
05	0650	70200023	2350	1300	1710	450X1014	450X514	228X280	140x216	515
06	0651	70200024	2350	1300	1710	450X1014	450X514	228X280	140x216	525
07	0900	70200025	2350	1300	1710	450X1014	450X514	250X320	140X216	570
08	1100	70200026	2800	1600	2035	575X1214	575X514	250X320	140X216	930
09	1300	70200027	2800	1600	2035	575X1214	575X514	250X320	140X216	990
10	1700	70200028	3300	2000	2220	600X1514	600x714	315x450	228x280	1750
11	2100	70200029	3300	2000	2220	600X1514	600x714	410X600	228x280	1820

DISTRIBUTOR :

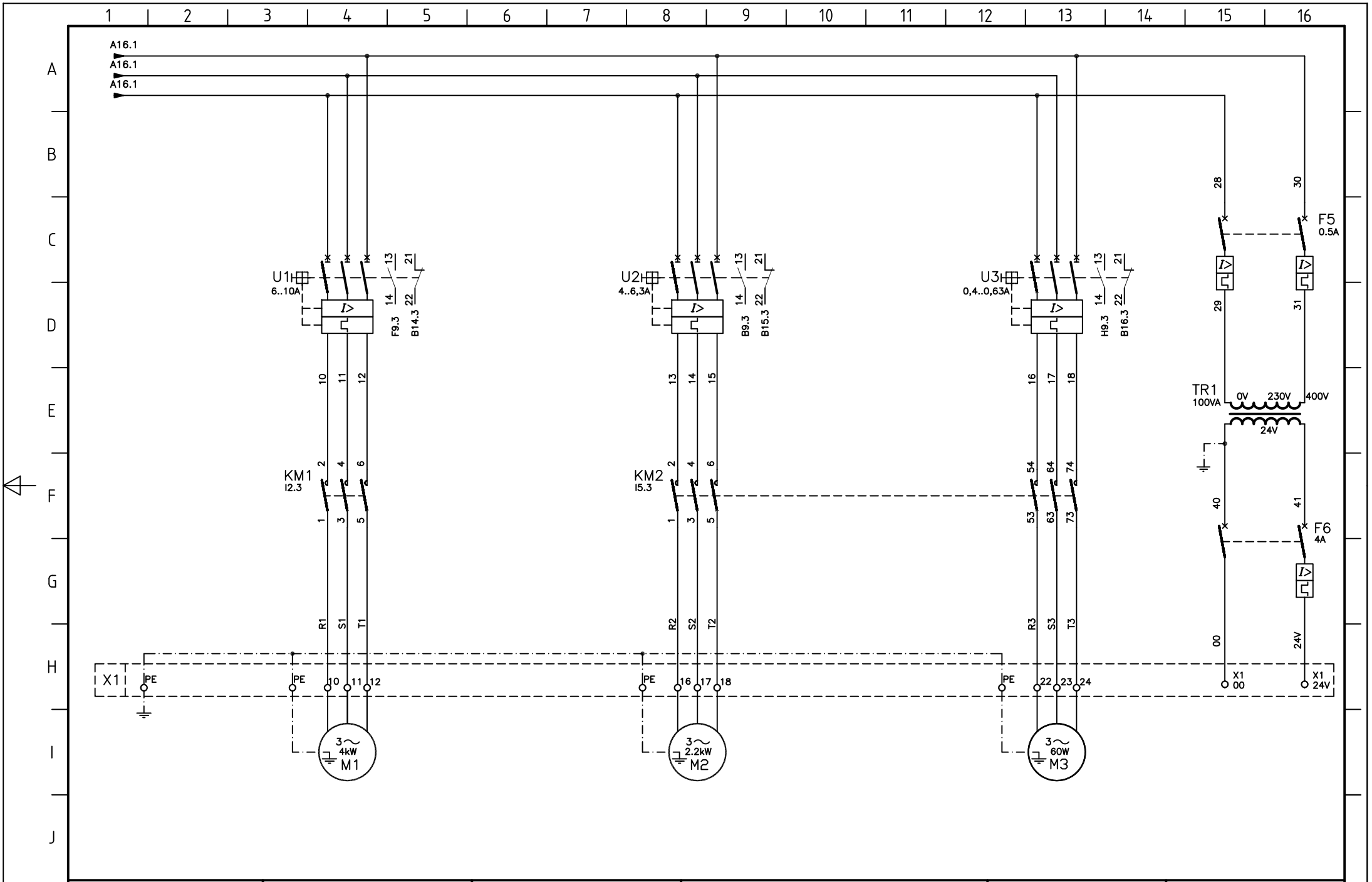
URANIO N° 20
P.I. AIMAYR
28330-SAN MARTIN DE LA VEGA. MADRID. (SPAIN)

fisair
air humidity control

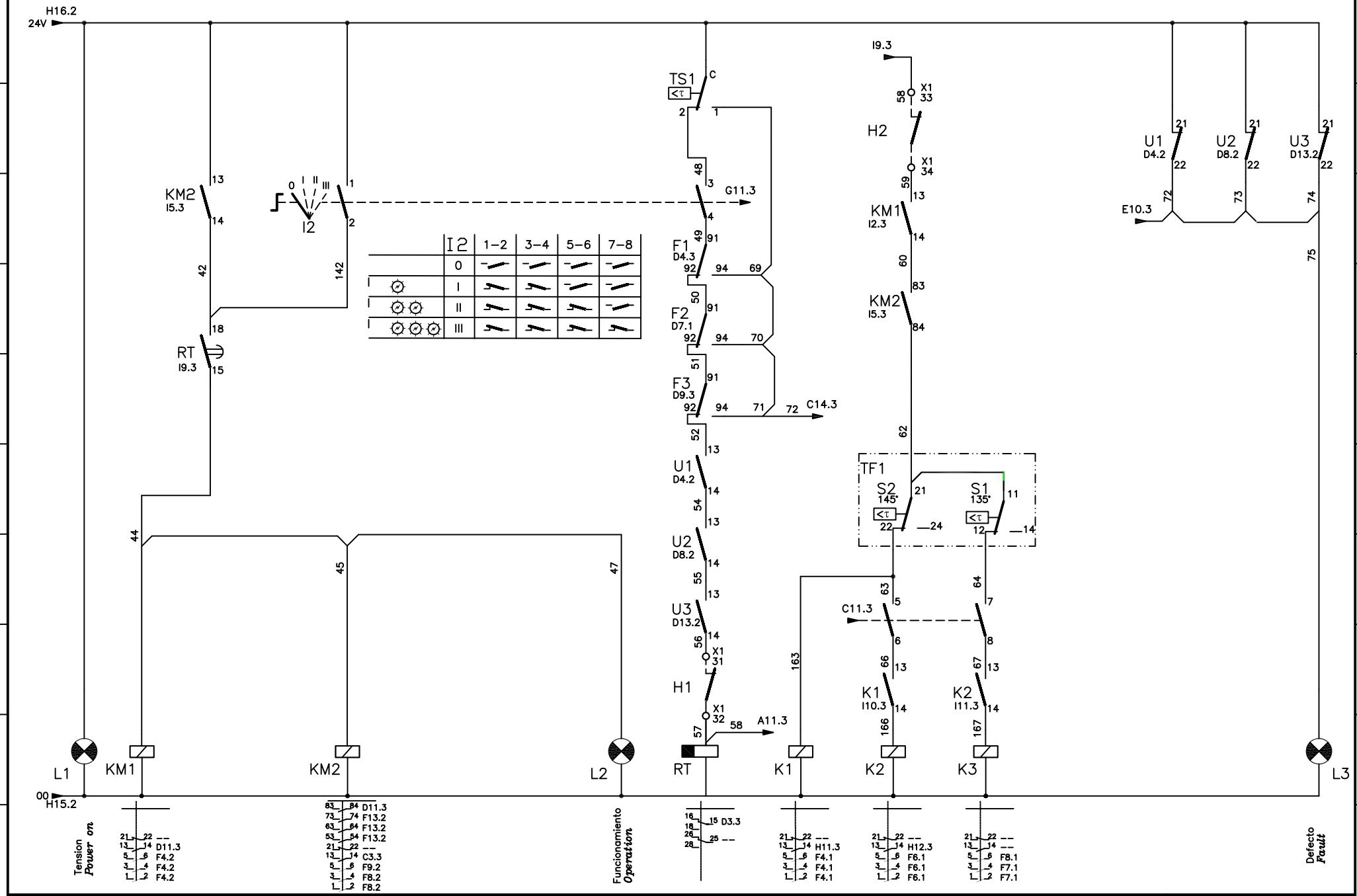
01/00 F-00596-02/E



fisair air humidity control	Nº PLANO: *Dwg Nr:* F-5190-001	TIPO: *Type:* DFRC-0651	DENOMINACIÓN: *Denomination:* ESQUEMA ELÉCTRICO *Wiring diagram*	DIBUJADO: *Drawn:* B.R.G.	APROBADO: *Approved:* H.L.A.
	REVISION: *Review:* –	CONEXIÓN: *Supply:* 400V/III/50Hz		COMPROBADO: *Checked:* J.M.B.	HOJA Nº: *Sheet Nr:* 1 DE: *Of:* 5



fisair air humidity control	Nº PLANO: *Dwg Nr:* F-5190-001	TIPO: *Type:* DFRC-0651	DENOMINACIÓN: *Denomination:* ESQUEMA ELÉCTRICO *Wiring diagram*	DIBUJADO: *Drawn:* B.R.G.	APROBADO: *Approved:* H.L.A.
	REVISION: *Review:* –	CONEXIÓN: *Supply:* 400V/III/50Hz		COMPROBADO: *Checked:* J.M.B.	HOJA Nº: *Sheet Nr:* 2 DE: *Of:* 5



I2	1–2	3–4	5–6	7–8
0	–	–	–	–
I			–	–
II				–
III				

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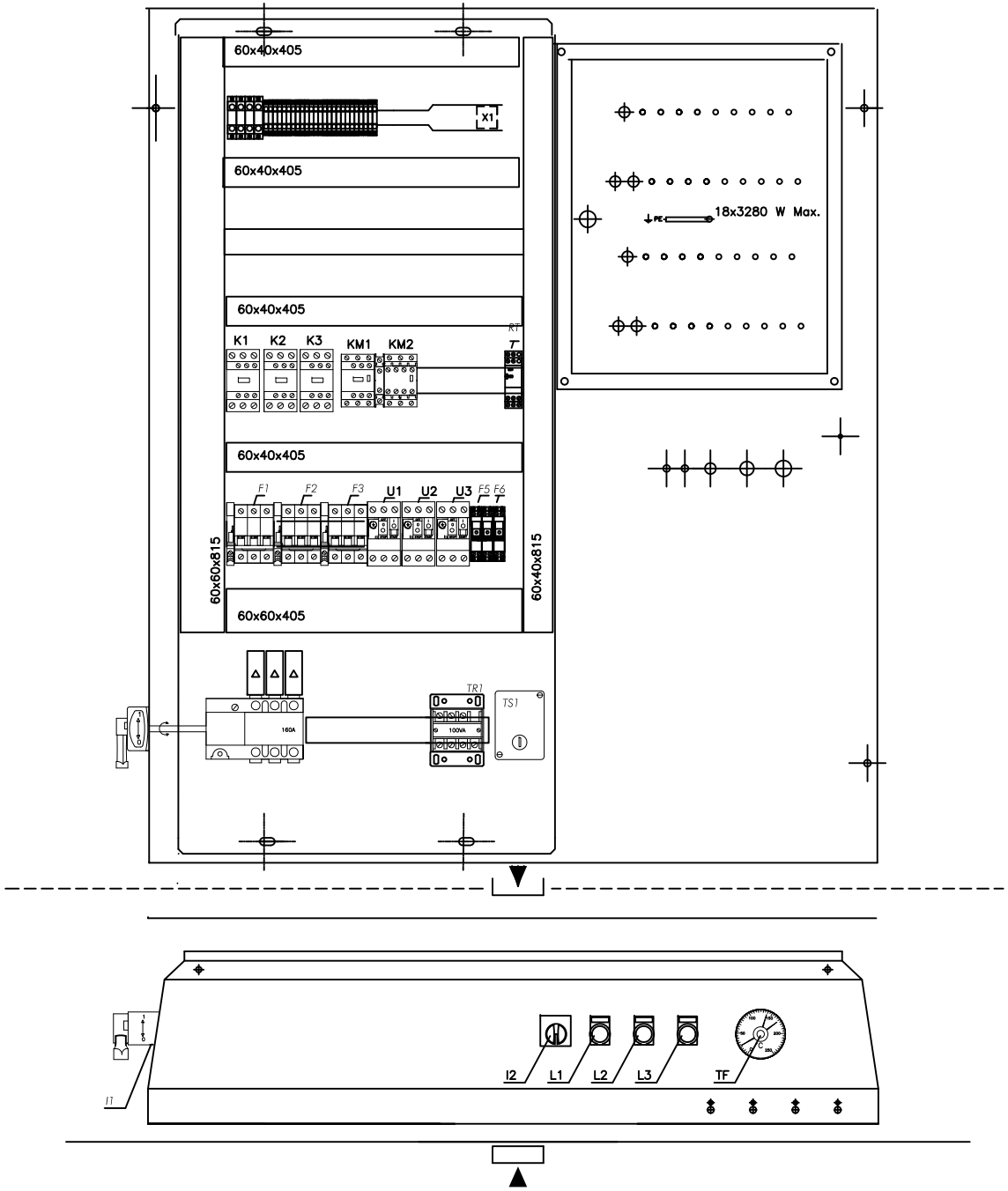
	REVISION: *Review:* A	CONEXIÓN: *Supply:* 400V/III/50Hz		COMPROBADO: *Checked:* J.M.B.	HOJA Nº: *Sheet Nr:* 3 DE: *Of:* 5



fisair air humidity control	Nº PLANO: *Dwg Nr:* F-5190-001	TIPO: *Type:* DFRC-0651	DENOMINACIIÓN: *Denomination:* ESQUEMA ELÉCTRICO *Wiring diagram*	DIBUJADO: *Drawn:* B.R.G.	APROBADO: *Approved:* H.L.A.
	REVISION: *Review:* A	CONEXIÓN: *Supply:* 400V/III/50Hz		COMPROBADO: *Checked:* J.M.B.	HOJA Nº: *Sheet Nr:* 4 DE: *Of:* 5

Nombre *Name*	Descripción *Description*	Posición *Position*	Nombre *Name*	Descripción *Description*	Posición *Position*
I1	Interruptor seccionador *Isolator switch*	A2.1	I2	Interruptor selector de funcionamiento *Selector switch*	C5.3
F1		D4.3	RT	Relé temporizador a la desconexión *Delaied motor disconn relay*	I9.3
F2	Protección magnetotérmica de E2. *(E2) circuit breaker*	D7.1	TS1	Termostato de seguridad de bateria de reactivación *Heater safety thermostat*	A9.3
F3	Protección magnetotérmica de E3. *(E3) circuit breaker*	D9.3			
U1	Protección magnetotérmica de motor–ventilador M1 *Circuit breaker for (M1)*	D4.2	TF1	Termostato de funcionamiento dos etapas S1/S2 *(Two stages S1/S2) operation thermostat*	F11.3
U2	Protección magnetotérmica de motor–ventilador M2 *Circuit breaker for (M2)*	D8.2	H1	Conexión primera etapa higrostato *Higrostat conection 1(Whole unit OFF)*	H9.3
U3	Protección magnetotérmica de motor–ventilador M3 *Circuit breaker for (M3)*	D13.2	H2	Conexión segunada etapa higrostato *Higrostat conection 2(Heater OFF)*	B11.3
K1		I10.3	L1	Indicacion puesta en tensión *Power ON LED*	I1.3
K2	Contactor de E2 *E2 contactor*	I11.3	L2	Indicacion puesta en funcionamiento *Operation LED*	I8.3
K3	Contactor de E3 *E3 contactor*	I12.3	L3	Indicacion defecto *Fault LED*	I16.3
KM1	Contactor del motor ventilador M1 *M1 contactor*	I2.3			
KM2	Contactor motor de M2/M3 *Fan motor M2 and drive motor M3 contactor*	I5.3			
					--
BR	Bateria de resistencias (Tres etapas: E1, E2, E3) *3–Stages air heater*	J7.1			--
M1	Motor ventilador de proceso. *Process fan motor*	I4.2			--
M2	Motor ventilador de reactivación. *Reactivation fan motor*	I8.2			--
M3	Motor reductor. *Rotor drive motor*	I13.2			--
F5	Protección magnetotérmica de TR. *Circuit breaker for transformer*	C16.2			--
TR1	Transformador del circuito de maniobra *Transformer for control wiring*	E16.2			--
F6	Protección magnetotérmica del circuito de maniobra *Circuit breaker for control wiring*	G16.2			--

fisair
air humidity control

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REVISION: *Review:* A	CONEXIÓN: *Supply:* 400V/III/50Hz		COMPROBADO: *Checked:* J.M.B.	HOJA Nº: *Sheet Nr:* 5 DE: *Of:* 5

DECLARACIÓN CE DE CONFORMIDAD
EC CONFORMITY DECLARATION
EG KONFORMITÄTSERKLÄRUNG
DECLARATION CE DE CONFORMITÉ

Departamento de Dirección de Calidad
Quality Management Department

Qualitätsmanagement-Abteilung
Département de gestion de la qualité

FISAIR S.L.U.
C/ Ciudad de Frias,33-(P.L. Camino de Getafe)
28021 Madrid SPAIN
Tel.: (+34) 916921514
info@fisair.com

La presente declaración de conformidad se expide bajo exclusiva responsabilidad del fabricante.
This declaration of conformity is issued under the sole responsability of the manufacturer.
Diese konformitätserklärung wird in der alleinigen verantwortung des herstellers ausgestellt.
Cette déclaration de conformité est délivrée sous la seule responsabilité du fabricant.

Descripción/ Product description/ Produktbeschreibung/ Description du produit: **DFRC**

Tipo de máquina/ Machine type/ Maschinetyp/ Type de machine: **MÁQUINA/ MACHINE/ MASCHINE/ MACHINE**

Marca/ Brand/ Marke/ Marque: **FISAIR**

Es conforme con la legislación de armonización pertinente a la unión europea:
It complies with the harmonization legislation relevant to the European Union:
Es entspricht den für die Europäische Union relevanten Harmonisierungsgesetzen

2006/42/CE
2014/30/UE
2014/35/UE

Es conforme con las siguientes normas:
It complies with the following standards:
Es entspricht den folgenden Normen:
Il est conforme aux normes suivantes:

UNE-EN ISO 12.100:2012
UNE-EN 60204-2:2019
UNE-EN 61000-6-6:2012
UNE-EN 61000-6-3:2012

FISAIR se exime de cualquier responsabilidad a menos que se cumplan con todas las instrucciones de instalación y funcionamiento proporcionadas por FISAIR, o si los productos han sido modificados o alterados sin el consentimiento por escrito de FISAIR, o si tales productos han sido sometidos a un mal uso, mala manipulación, alteración, mantenimiento inadecuado o muestran consecuencias de accidente o utilización negligente.
FISAIR disclaims any liability unless all installation and operating instructions provided by FISAIR are followed, or if products have been modified or altered without FISAIR's written consent, or if such products have been subjected to misuse. use, mishandling, alteration, improper maintenance or show consequences of accident or negligent use.

Con exclusión de responsabilidades sobre las partes o componentes adicionados o montados por el cliente.
With no liability for the parts or components added or assembled by the customer.
Unter Ausschluß der Verantwortung über die vom Kunden bereitgestellten und/oder angebauten Teile.
Avec exclusion des responsabilités concernant les parties ou les composants ajoutés ou assemblés par le.

Juan Boeta Tejera
-Chairman and CEO- July 2020
Property of FISAIR

Rev01

FISAIR S.L. WARRANTY POLICY

Technical Direction Department
Departamento de Dirección Técnica

FISAIR S.L.
C/ Uranio, 20 (Pol. Ind. Aimayr)
28330 San Martín de la Vega (Madrid) SPAIN
Tfº (34) 916921514
Fax (34) 916916456

Two-year limited Warranty

FISAIR warrants to the original purchaser that its products will be free from defects in materials and parts for a period of two (2) years after installation or twenty-seven (27) months from the date FISAIR ships such product, whichever date is the earlier.

If any FISAIR product is found to be defective in material or assembly during the applicable warranty period, FISAIR's entire liability, and the purchaser's sole and exclusive remedy, shall be the repair or replacement of the defective product or part.

Warranty disclaimer

FISAIR shall not be liable for any costs or expenses, whether direct or indirect, associated with the installation, removal or reinstallation of any defective product.

The Limited Warranty does not include any consumer part such as joints, pulleys, filters or

media. FISAIR's Limited Warranty shall not be effective or actionable if:

a) All related product invoices have been payed in time and terms.
b) Unless there is compliance with all installation and operating instructions furnished by FISAIR, or if the products have been modified or altered without the written consent of FISAIR, or if such products have been subject to accident, misuse, mishandling, tampering, negligence or improper maintenance. Such situations could be an incorrect power supply connection, crashed with inappropriate objects, security protection devices unblocked and so.

Any warranty claim must be submitted to FISAIR in writing within the stated warranty period.

Parts warranty

Defective parts may be required to be returned to FISAIR. In case any part is claimed as a faulty one, FISAIR will ask the customer to send the part back to the factory in order to analyze if the part is failing due to any of above referred actions (see warranty disclaimer) or due to effective part failing.

If the part must be replaced immediately, FISAIR will ship the part to the customer immediately and invoice the part with a 30 days delay payment for the faulty part to be returned. If the part is returned in this period, the part fail analysis would be made to emit a technical report for the warranty coverage based in this Warranty Statement document.

In case that the part is failing due to a lack of quality, FISAIR will credit this invoice in order to stop the payment. In case FISAIR does not receive the part in this period, or if the failure is due to the reasons covered in the Warranty disclaimer paragraph, the invoice will be effective.

In case any part from the product / shipment is missing, the customer should notify FISAIR before 3 days from the shipment date of arrival.

Service Covered by warranty

In case that there is any FISAIR product that should be serviced in order to recover its proper used designed, FISAIR will select the person (s) in charge of this operation. These qualified technicians should have the enough knowledge to service FISAIR units.

No company should practice a warranty service without the writing FISAIR notice giving the authorization to do it and if any cost should be cover by FISAIR should be advised in advance to the service job. In case that FISAIR should send FISAIR staff to solve the solution, trip expenses are not covered by the warranty.

FISAIR's Limited Warranty is made in lieu of, and FISAIR disclaims all other warranties, whether express or implied, including but not limited to any implied warranty of merchantability, any implied warranty of fitness for a particular purpose, any implied warranty arising out of a course of dealing or of performance, custom or usage of trade.

FISAIR shall not, under any circumstances be liable for any direct, indirect, incidental, special or consequential damages (including, but not limited to, loss of profits, revenue or business) or damage or injury to persons or property in any way related to the manufacture or the use of its products. The exclusion applies regardless of whether such damages are sought based on breach of warranty, breach of contract, negligence, strict liability in tort, or any other legal theory, even if FISAIR has notice of the possibility of such damages.

By purchasing FISAIR's products, the purchaser agrees to the terms and conditions of this Limited Warranty.

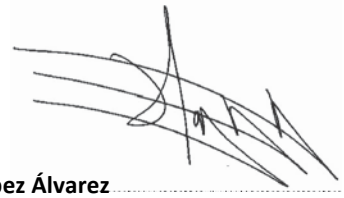
Extended warranty

The original user may extend the term of the FISAIR Limited Warranty for a limited number of months past the initial applicable warranty period and term provided in the first paragraph of this Limited Warranty. All the terms and conditions of the Limited Warranty during the initial applicable warranty period and term shall apply during any extended term.

Each case should be valued in terms of type of product, equipment application, use and location of the product operation site.

Any extension of the Limited Warranty under this program must be in writing, signed by FISAIR, and paid for in full by the purchaser.

Technical Direction Department:



Hugo J. López Álvarez
San Martin de la Vega, junio 2013