USER MANUAL
DFLEX SERIES

MUSX-EN-20-0

In compliance with the Rules and Standards of the European Union on Machine Safety,
it is essential to read this protocol carefully before installing any equipment

FISAIR S.L. C/Uranio, 20; Pol. Ind. Aimayr, 28330 San Martín de la Vega (Madrid) España.
Tel: (+34) 91 692 15 14 Fax: (+34) 91 691 64 56 | info@fisair.com| fisair.com

AENOR ER Registered Company ISO 9001
RC-0529/2015

Contents

1. Introduction.

To ensure the correct operation of your **DFLEX** dehumidifier, please read this manual carefully and keep it for future reference.

If there is any part of this document that you do not understand, or if you have any questions about your dehumidifier, please contact us:

FISAIR, S.L.U.

Tel.: (+34) 91 692 15 14 – Madrid – SPAIN
Fax: (+34) 91 691 64 56 – Madrid – SPAIN

Email address www.info@fisair.com

Or contact your local distributor.

IMPORTANT!

The correct use of the dehumidifier includes following our instructions for installation, set-up, operation and maintenance, as well as following the steps indicated in the instructions in the correct sequence as described.

This dehumidifier may only be used by persons who are fully qualified and authorized to do so.

Any person who transports and/or uses the unit or who works with it must read and understand the relevant section of this manual, in particular the section entitled "Safety Instructions".

You are advised to keep a copy of the user manual with the dehumidifier (or nearby).

Ignoring these instructions may invalidate all applicable guarantees and warranties.

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.

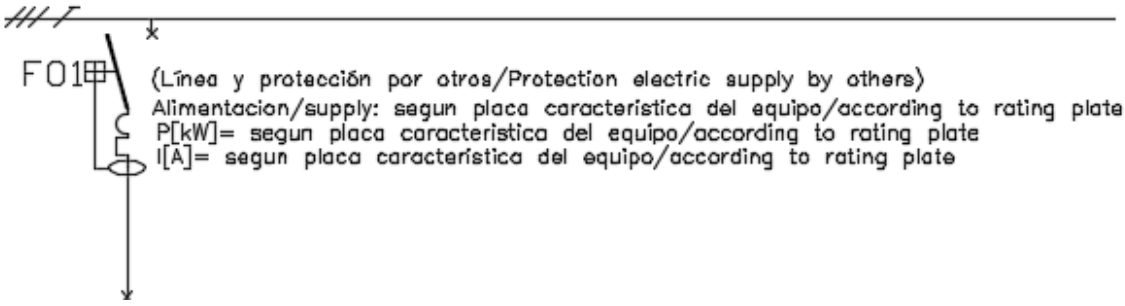
Atención

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.

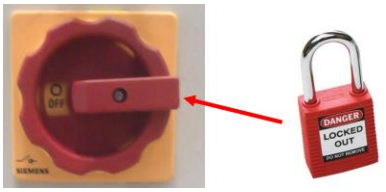
Sobre los componentes eléctricos

- 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.



De igual modo, en equipos dotados de calentador de gas o vapor para labores de mantenimiento se debe consignar la válvula de alimentación de gas combustible o vapor mediante un dispositivo loto de suministro opcional.

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

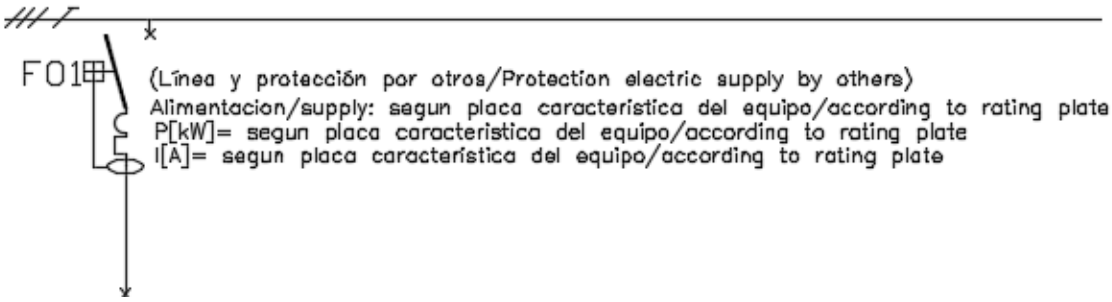
The presence of this symbol on a hazard or warning label indicates that there is a risk of electrocution, which may result in life threatening injury or death if the instructions are not respected.

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.

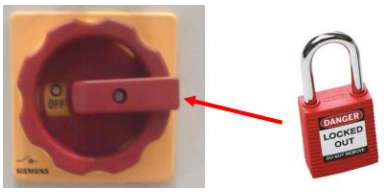
Electrical components

- 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.



Similarly, the fuel, gas or steam feed valves be locked out in gas or steam equipment by means of a suitable mechanical valve lockout, for maintenance.

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.

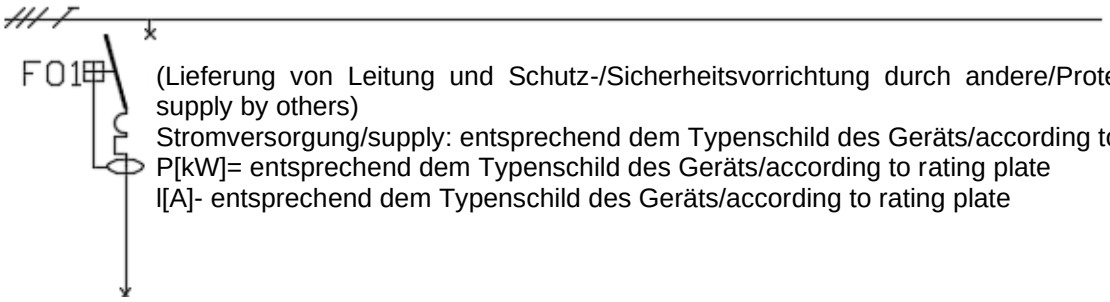
Achtung

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.

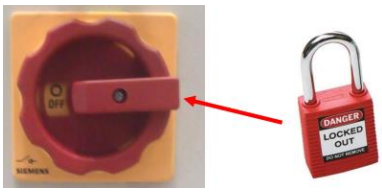
Über die elektrischen Komponenten

- 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.



Gleichermaßen muss bei Gas- oder Dampfanlagen für Wartungsarbeiten das Gas- oder Dampfzufuhrventil) mit einer Wartungssicherung (LOTO) versehen werden, die optional mitgeliefert werden kann.

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.

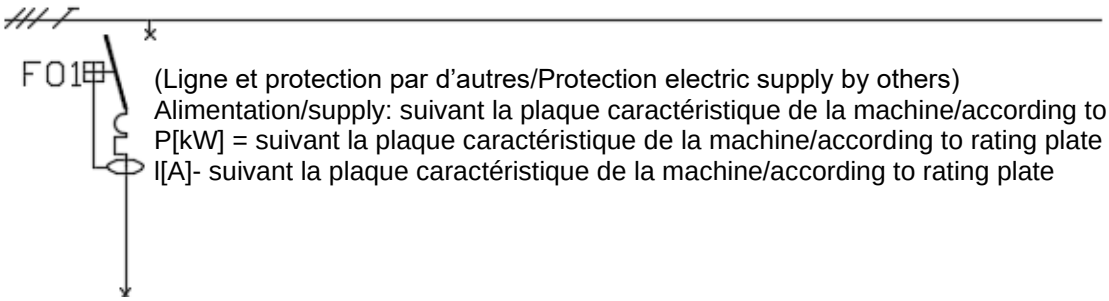
Attention

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
I[A]- 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.

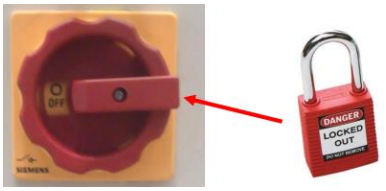
Concernant les composants électriques

- 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.



De même, sur les équipements à gaz ou à vapeur pour les travaux de maintenance, il faut consigner le robinet d'alimentation en gaz combustible ou en vapeur à l'aide d'un dispositif loto fourni en option.

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 and storage.

When in transit, the unit must be protected from impacts of any kind, and all possible measures must be taken to prevent malfunctions due to improper loading or unloading of the unit.

When lifting the equipment, always use a pallet truck or forklift.

Keep the unit dry and protected from the elements while in storage.

The unit must be stored in a location where the ambient temperature is between -20ºC and 60ºC and with a relative humidity of no more than 80%.

4. Operating principle.

The FISAIR DFLEX series air dehumidifiers operate using a substance (silica gel) which adsorbs moisture from the air and is configured as a cylinder with many small channels of this material all running in the same direction as the air flow.

The front surface of the base of this cylinder is divided into two zones: one is intended to carry out the drying process, and the other to regenerate or reactivate the desiccant. The large surface contact area of air to desiccant material within this configuration enables an effective drying process to be achieved with a minimum volume of material.

The dry/process air circuit occupies 75% (270°) of the surface area of the desiccant rotor in the FISAIR DFRA series dehumidifiers, where the material adsorbs water vapour from the air passing through it. The reactivation air circuit is heated by a heating component and passes through the rotor in the opposite direction to the process air. This removes moisture from the desiccant material; thus regenerating it for a new cycle.

A rotor motor (low power gearmotor with a V-belt drive on the perimeter) ensures the drying process is continuous and uniform.

The system design is completed with a set of seals separating the two air circuits and seals around the perimeter of the rotor; thus ensuring separation between air flows.

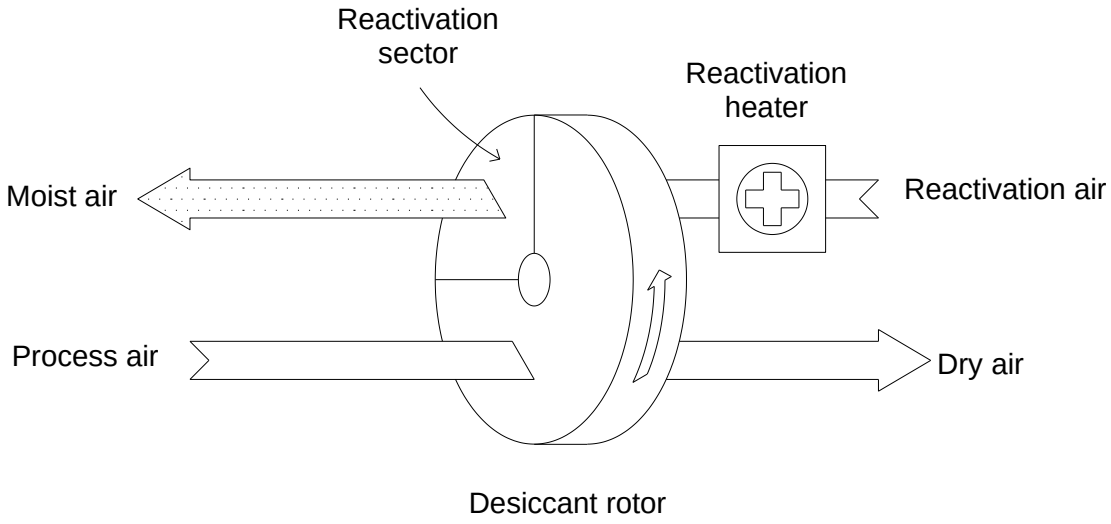


Figure 1: Operating principle of drying by adsorption rotor.

fisair
air humidity control

CODING PRODUCT DFRA / DFLEX

Rev01 28-02-19

REACTIV. SYST.	PROCESS AIR INITIAL FILTER	REACTV. AIR INITIAL FILTER	PRE-COILS		POST-COILS		FANS		DRY AIR FINAL FILTER	HEAT RECOVERY	FINISHING	ELECTRICAL POWER SUPPLY	CONTROL	OTHER SPECIAL
DFRA-0900	E	GF	GF	WS	WS	WS	WS	SF	SF	H14	R	KR	405	AE04	0

SERIES DFRA- / DFLEX

MODEL

DFRA-	DFLEX
0100	1100
0130	1300
0160	1700
0175	2100
0200	2900
0230	3500
0300	
0400	
0500	
0650	
0900	

REACTIVATION SYSTEM

E	=	Electric coil
A	=	Coil for hot water
S	=	Hot Water coil + electric coil
V	=	Coil for saturated steam
H	=	Stainless steel coil for saturated steam
D	=	Saturated steam coil + electric coil
X	=	Stainless steel coil for saturated steam+ electric coil
G	=	Direct Gas

PROCESS AIR FILTERS

00	=	Without filters
G0	=	1 Filters stage class G4 (EN779:2012)
GF	=	First stage class G4 filters and second stage class F9 (EN779:2012)
C0	=	1 stage of filters of a specific class other than G4 (EN779:2012)
0F	=	1 Filters stage class F9 (EN779:2012)
CC	=	Two stages of filtering other than G4F9(EN779:2012)

REACTIVATION AIR FILTERS

00	=	Without filters
G0	=	1 Filter stage class G4 (EN779:2012)
GF	=	First stage class G4 filters and second stage class F9 (EN779:2012)
C0	=	1 stage of filters of a specific class other than G4 (EN779:2012)
0F	=	1 Filter stage class F9 (EN779:2012)
CC	=	Two stages of filtering other than G4F9(EN779:2012)

PRE-HEATING

00	=	No pre-heating
WE	=	ECO pre-heating coils for hot water.
WS	=	STANDARD pre-heating coil for hot water.
WH	=	Water High Power Heating Coil
CW	=	Custom pre-heating coil

PRE-COOLING

00	=	No pre-cooling
WE	=	ECO pre-heating coil for cold water.
WS	=	STANDARD pre-cooling coil for cold water.
WH	=	High-power pre-cooling coil for cold water.
DS	=	STANDARD pre-cooling coil for direct expansion.
CW	=	Custom pre-cooling coil

POST-COOLING

00	=	No post-cooling
WE	=	ECO post-cooling coil for cold water.
WS	=	STANDARD post-cooling coil for cold water.
WH	=	High-power post-cooling coil for cold water.
DS	=	STANDARD post-cooling coil for direct expansion.
CW	=	Custom Post-cooling coil

POST-HEATING

00	=	No post-heating
WE	=	ECO post-heating coil using hot water.
WS	=	STANDARD post-heating coil using hot water.
WH	=	Water High power heating Coil
CW	=	Custom Post-Heating coil

PROCESS AIR / DRY AIR FAN

00	=	No process/dry air fan
SF	=	STANDARD fan
PF	=	POWERED fan
PS	=	Plug-Fan for DFRA serie
PP	=	Multiple Plug-Fan (Wall-Fan)
PT	=	Multipl Plug Fan (Tandem Plug-Fan)

REACTIVATION AIR / MOIST AIR FAN

SF	=	STANDARD fan
PF	=	POWERED fan

DRY AIR FILTER

000	=	Without final filter at dry air.
F00	=	Class F9 EN 779: 2012 /ePM1 80< ISO16890. Filter fitted after the process air/dry air fan (requires a Plug-Fan ventilator)
H13	=	HEPA H13 (EN 1822:2011) filter fitted after the process air/dry air fan (requires a Plug-Fan ventilator)
H14	=	HEPA H14 (EN 1822:2011) filter fitted after the process air/dry air fan (requires a Plug-Fan ventilator)
FH3	=	Class F9 EN 779: 2012 /ePM1 80< ISO16890 + HEPA H13 (EN 1822:2011). Filter fitted after the process air/dry air fan (requires a Plug-Fan ventilator)
FH4	=	Class F9 EN 779: 2012 /ePM1 80< ISO16890 + HEPA H14 (EN 1822:2011). Filter fitted after the process air/dry air fan (requires a Plug-Fan ventilator)

SENSITIVE HEAT RECOVERY UNIT

0	=	Without heat recuperator. No by-pass in desiccant rotor.
R	=	Static heat recuperator installed in the discharge of wet air.
D	=	By-pass air damper in descending rotor.
M	=	Static heat recuperator installed in the discharge of wet air. By-pass air damper in descending rotor.

FINISHING

00	=	Standard production of components. Protection grade IP50 and finished with RAL7035 colour.
0R	=	Standard production of components. Protection grade IP50 and finished with specific colour (RAL____).
K0	=	Standard production of components. Protection grade IP54 and finished with RAL7035 colour.
KR	=	Standard production of components. Protection grade IP54 and finished with specific colour (RAL____).

fisair

air humidity control

REACTIV. SYST.	PROCESS AIR INITIAL FILTER	REACTV. AIR INITIAL FILTER	PRE-COILS	POST-COILS	FANS	DRY AIR FINAL FILTER	HEAT RECOVERY	FINISHING	ELECTRICAL POWER SUPPLY	CONTROL	OTHER SPECIAL

CODING
PRODUCT
DFRA / DFLEX

POWER SUPPLY OPTIONS **(NOT INCLUDED IN MECHANICAL DRAWINGS)**

405	=	Standard electrical power supply at 400V ±5% /III/50Hz
N05	=	Electrical power supply at 400V ±5% /III/50Hz
406	=	Electrical power supply at 400V ±5% /III/60Hz
N06	=	Electrical power supply at 400V±5%/III+N/60Hz
445	=	Electrical power supply at 440V ±5% /III/50Hz
N45	=	Electrical power supply at 440V±5%/III+N/50Hz
446	=	Electrical power supply at 440V ±5% /III/60Hz
N46	=	Electrical power supply at 440V±5%/III+N/60Hz
466	=	Electrical power supply at 460V ±5% /III/60Hz
N66	=	Electrical power supply at 460V±5%/III+N/60Hz
235	=	Electrical power supply at 230V ±5% /III/50Hz
236	=	Electrical power supply at 230V ±5% /III/60Hz

CONTROL OPTIONS **(NOT INCLUDED IN MECHANICAL DRAWINGS)**

BE00	=	Basic ON/OFF control with electric heater for reactivation.
BV00	=	Basic ON/OFF control with saturated steam heater for reactivation.
AE13	=	Advanced electrical reactivation control and one actuator. (Electrical . 0..10V)
AE27	=	Advanced electrical reactivation control and two actuators. (Electrical . 0..10V)
AE49	=	Advanced electrical reactivation control and four actuators. (Electrical . 0..10V)
AE57		Advanced electrical reactivation control and five actuators. (Electrical . 0..10V)
AE79		Advanced electrical reactivation control and sevent actuators. (Electrical . 0..10V)
CE27	=	Advanced electrical reactivation control and two actuators. (Electrical . (0..10V)+Profibus Gateway
CE49	=	Advanced electrical reactivation control and four actuators. (Electrical . (0..10V)+Profibus Gateway
CE57		Advanced electrical reactivation control and five actuators. (Electrical . (0..10V)+Profibus Gateway
CE79		Advanced electrical reactivation control and sevent actuators. (Electrical . (0..10V)+Profibus Gateway
AV03	=	Steam reactivation advanced control.
AV17	=	Advanced steam reactivation control and one actuator. (Electrical . 0..10V)
AV39	=	Advanced steam reactivation control and three actuators. (Electrical . 0..10V)
AV47		Advanced steam reactivation control and four actuators. (Electrical . 0..10V)
AV69		Advanced steam reactivation control and six actuators. (Electrical . 0..10V)
CV17	=	Advanced steam reactivation control and one actuator (Electrical 0..10V) + Profibus Gateway.
CV39	=	Advanced steam reactivation control and three actuators. (Electrical . (0..10V)+Profibus Gateway
CV47		Advanced steam reactivation control and four actuators. (Electrical . (0..10V)+Profibus Gateway
CV69		Advanced steam reactivation control and six actuators. (Electrical . (0..10V)+Profibus Gateway
AG03	=	Gas reactivation advanced control.
AG17	=	Advanced gas reactivation control and one actuator. (Electrical . 0..10V)
AG39	=	Advanced gas reactivation control and three actuators. (Electrical . 0..10V)
AG47		Advanced gas reactivation control and four actuators. (Electrical . 0..10V)
AG69		Advanced gas reactivation control and six actuators. (Electrical . 0..10V)
CG17	=	Advanced gas reactivation control and one actuator (Electrical 0..10V) + Profibus Gateway.
CG39	=	Advanced gas reactivation control and three actuators. (Electrical . (0..10V)+Profibus Gateway
CG47		Advanced gas reactivation control and four actuators. (Electrical . (0..10V)+Profibus Gateway
CG69		Advanced gas reactivation control and six actuators. (Electrical . (0..10V)+Profibus Gateway

OTHER SPECIAL OPTIONS

C	=	Accessories that can be built-in subject to specification and preliminary study.

Example: **DFRA-0500V GFGF 00WS WE00 SFSF 000 R00 405BV000**

5.1 Rating plates

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

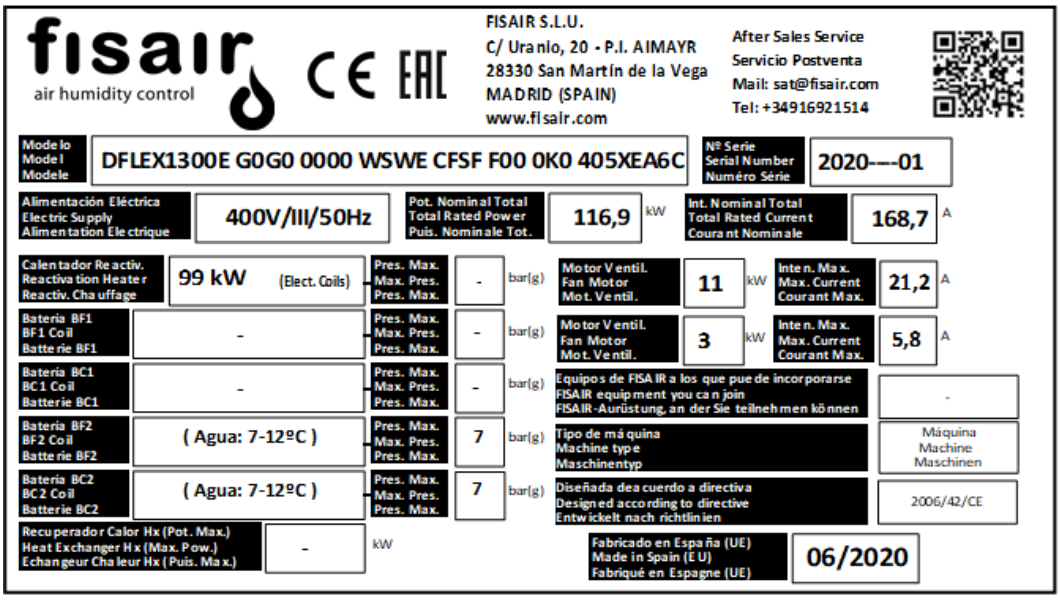
The EC Machinery Safety Regulation requires all machinery operated within the European Economic Community to have a rating plate indicating it’s main features, the machine serial number and the manufacturer's name displayed in a durable manner.

The DFLEX series has two types of plates:

- 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



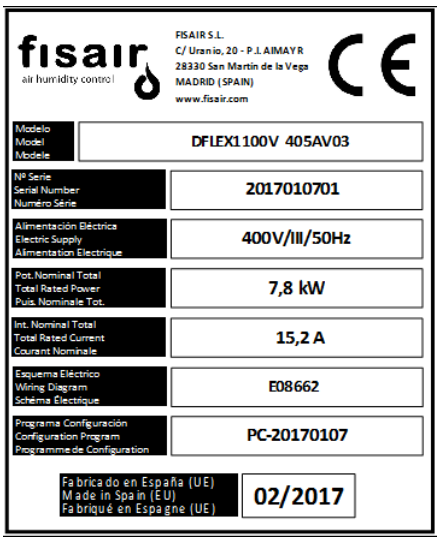


Figure 2: Example of a DFLEX series ratings plate

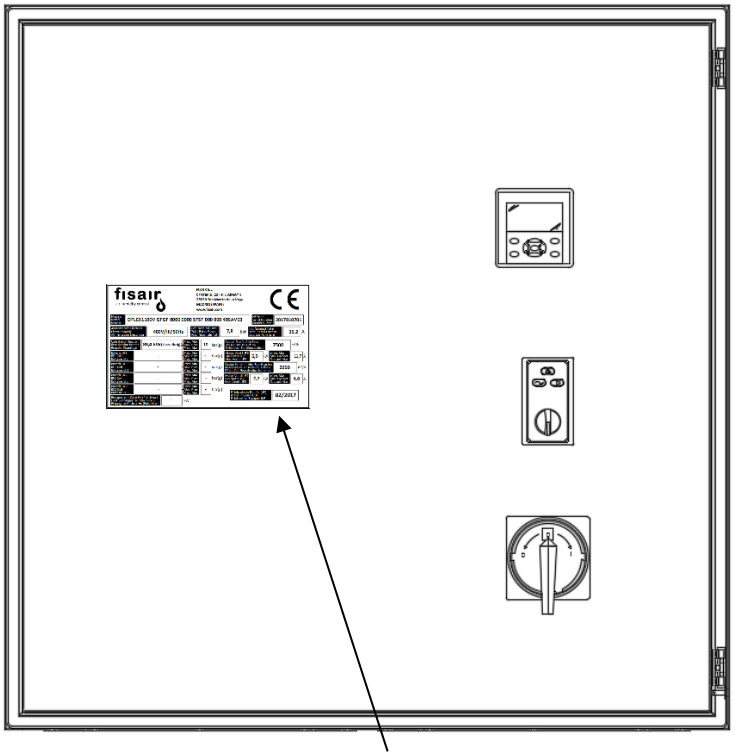


Figure 3: DFLEX series machine ratings plate location on control panel (visible from the outside)

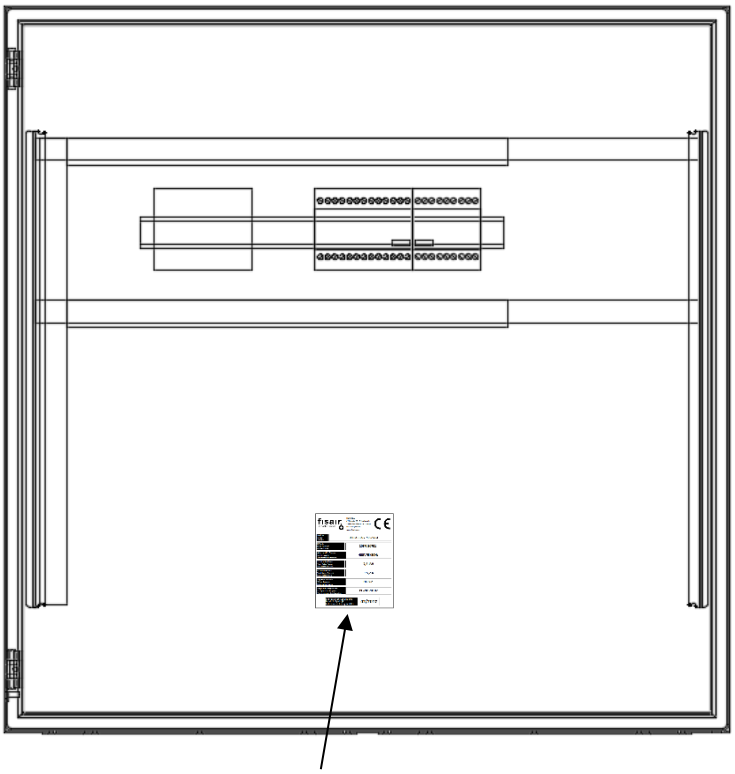


Figure 4: DFLEX series electric panel ratings plate location (on control panel after opening, on the reverse side)

6. Main components.

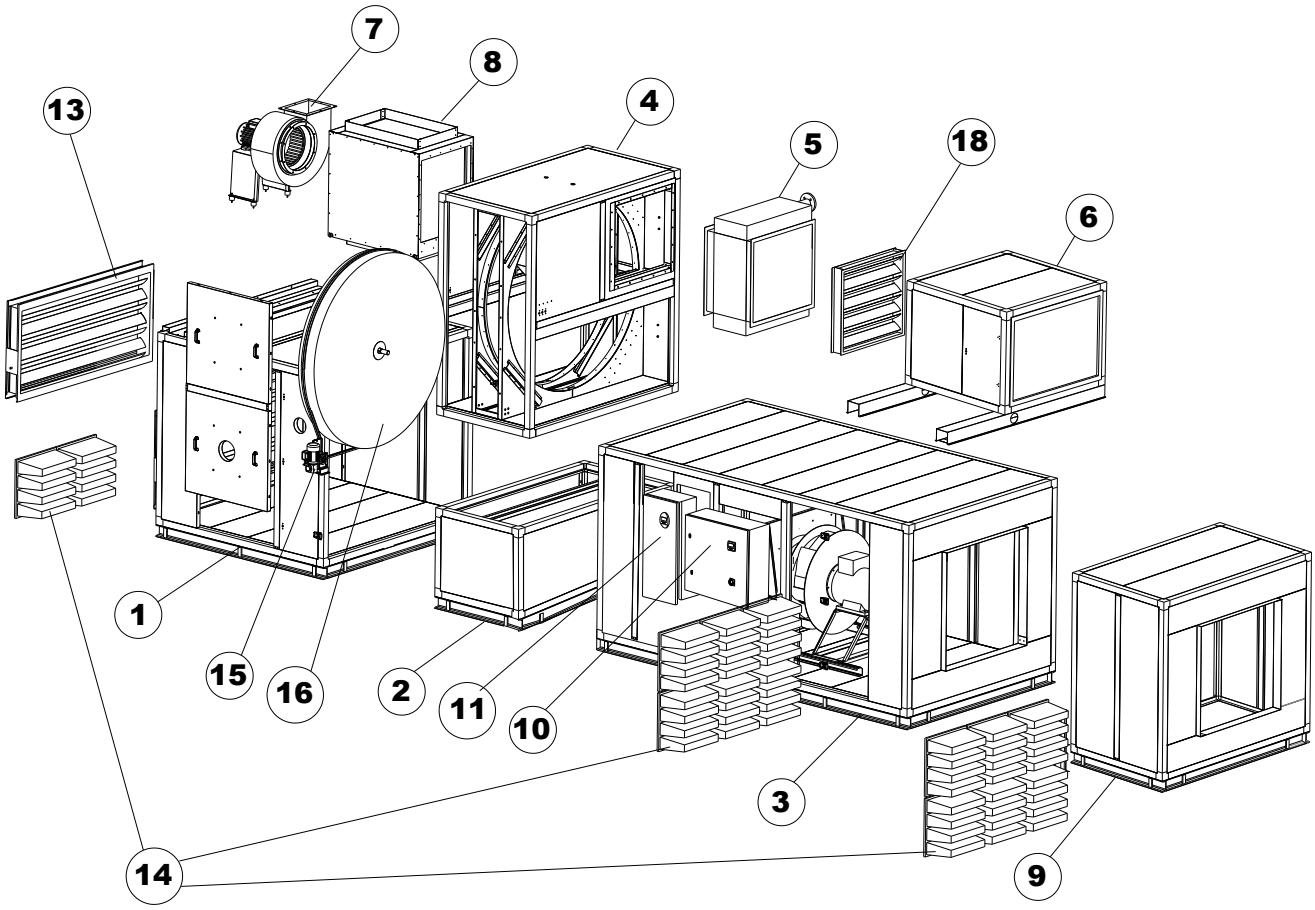


Figure 5: Exploded diagram of DFLEX series main components

1. Process air filtration module.
2. Base unit.
3. Dry air fan module.
4. Basic support unit for desiccant rotor and for internal drying and regeneration air circuit cavities.
5. Reactivation Battery module.
6. Reactivation air filtration module.
7. Reactivation/wet air fan.
8. Heat exchanger
9. Absolute filtration module (HEPA)
10. Electric control and protection panel.
11. Frequency inverter.
13. Process air control damper.
14. Air filters.
15. Rotor gearmotor
16. Desiccant rotor.
17. Process/dry air fan.
18. Reactivation air control damper.

7. Operating Parameters.

The unit's performance features will be affected by the working conditions. If your unit needs to be operated under other working conditions, please contact us.

Parameters	FISAIR Dehumidifier Series
	DFLEX
Dry Bulb temperature range of the process intake.	2°C to 55°C
Relative humidity range for the process intake.	Without restrictions
Dry Bulb temperature range of the reactivation intake.	-10°C to 55°C
Relative humidity range for the reactivation intake.	Without restrictions
Designed to be installed in locations exposed to sunlight and rain.	(**)
Temperature range in the area where the unit is to be installed.	-10°C to 50°C
Relative humidity range in the area where the unit is to be installed.	< 95%

(**) Available on special order.

8. Components technical data.

8.1 Rotor

Desiccant Rotor (Silica Gel) chemical resistance

Attention: The following chemicals will damage the DESICCANT ROTOR (SILICA GEL) or reduce its dehumidifying capacity.

Note: Using the below chemicals with FISAIR DFLEX air dehumidifiers may invalidate the guarantee.

INORGANIC COMPONENTS

	COMPONENTS	FORMULA	EFFECT
1	Lithium Chloride	LiCl	Obstruction of pores by absorption
2	Sodium Hydroxide	NaOH	Dissolves the silica gel
3	Potassium hydroxide	KOH	Dissolves the silica gel
4	Sodium chloride	NaCl	Decreases the performance of silica gel
5	Potassium chloride	KCl	Decreases the performance of silica gel
6	Calcium chloride	$CaCl_2$	Decreases the performance of silica gel
7	Magnesium chloride	$MgCl_2$	Decreases the performance of silica gel
8	Ammonia	NH_3	Basic gas
9	Hydrogen Fluoride	HF	Fluoride
10	Aluminium chloride	$AICl_3$	Decreases the performance of silica gel
11	Seawater	--	Decreases the performance of silica gel
12	High temp. steam	--	Dissolves the silica gel
13	Plasticiser	--	Obstructs silica gel pores
14	Strong acid	pH 2-3 and lower	Decreases the mechanical properties of ceramics

ORGANIC COMPONENTS

Please note that you must also be careful when using the following volatile organic components, which have a high boiling temperature and a low vapour pressure. Once the silica gel absorbs these volatile components, it does not release them. This means that silica gel will then not work to remove moisture.

	COMPOUND	FORMULA	EFFECT
1	Oil spray	--	Obstructs silica gel pores
2	Cyclohexanone	$C_6H_{10}O$	Decreases the performance of silica gel
3	Isopropyl alcohol	$(CH_3)_2CHOH$	Decreases the performance of silica gel
4	o-Xylene	--	Decreases the performance of silica gel
5	m-Xylene	$C_6H_4(CH_2)_2$	Decreases the performance of silica gel
6	p-Xylene		Decreases the performance of silica gel
7	Phenol	C_6H_5OH	Decreases the performance of silica gel
8	o-Dichlorobenzene	$C_6H_4CL_2$	Decreases the performance of silica gel
9	Methyl bromide	CH_3Br	Decreases the performance of silica gel

9. Installation.

9.1 Location

Before starting to install the unit, the following points need to be considered:

- Check the degree of protection (IP rating) as shown in the dehumidifier manual (IP50 run for indoor installation, IP54 run for outdoor installation).

- The selected location for installation must be suitable. Due account must be taken of the dehumidifier's external dimensions and the surrounding space required for its inspection and maintenance.

- Temperature/humidity conditions in the installation area:

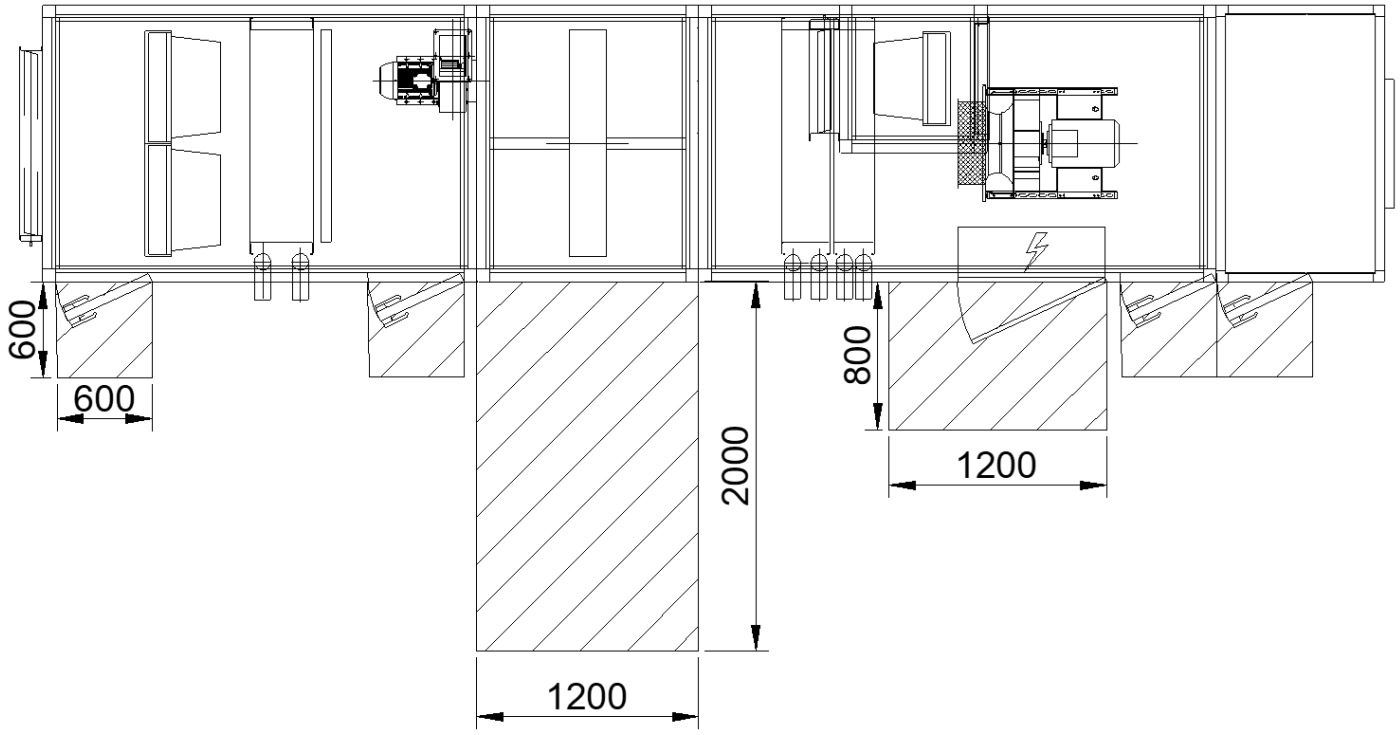
-15°C < **Temp** < 50ºC // **RH** <95%

9.2 Service space

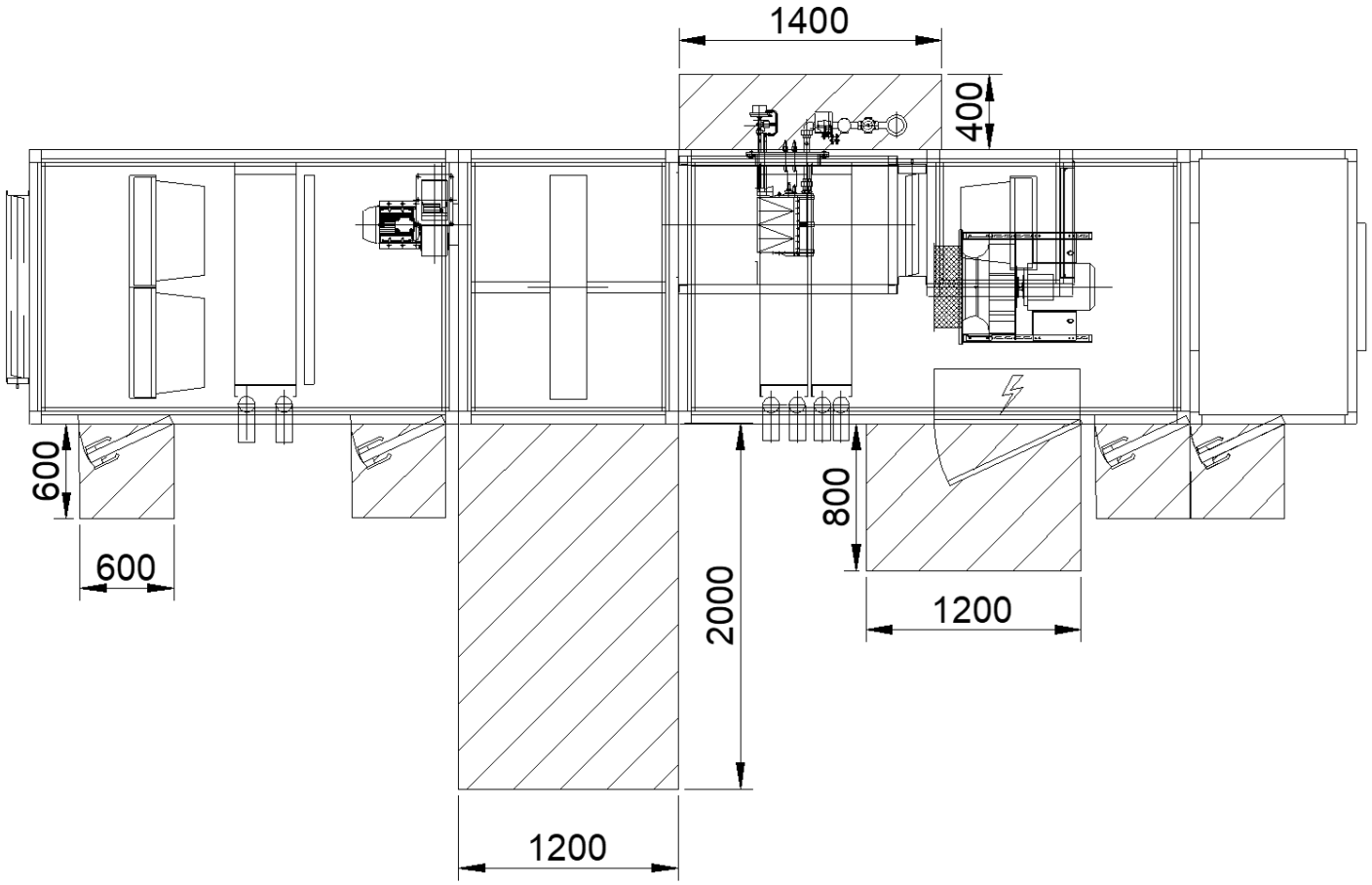
It is important to take due account of service space when installing the unit. This space is necessary for the following to be carried out on a periodic basis:

- Clean/replace the process and reactivation air filters.
- Check the status of the desiccant rotor fan surfaces, air circuit sealing joints, drive belt and reducer-motor (and, where required, repair or replace them).
- Check that the dry air and moist air motor-fans are working correctly.
- Check the reactivation air heater is working correctly.
- Gain access to the inside of the control and protection electrical board, and, if required, carry out repairs.

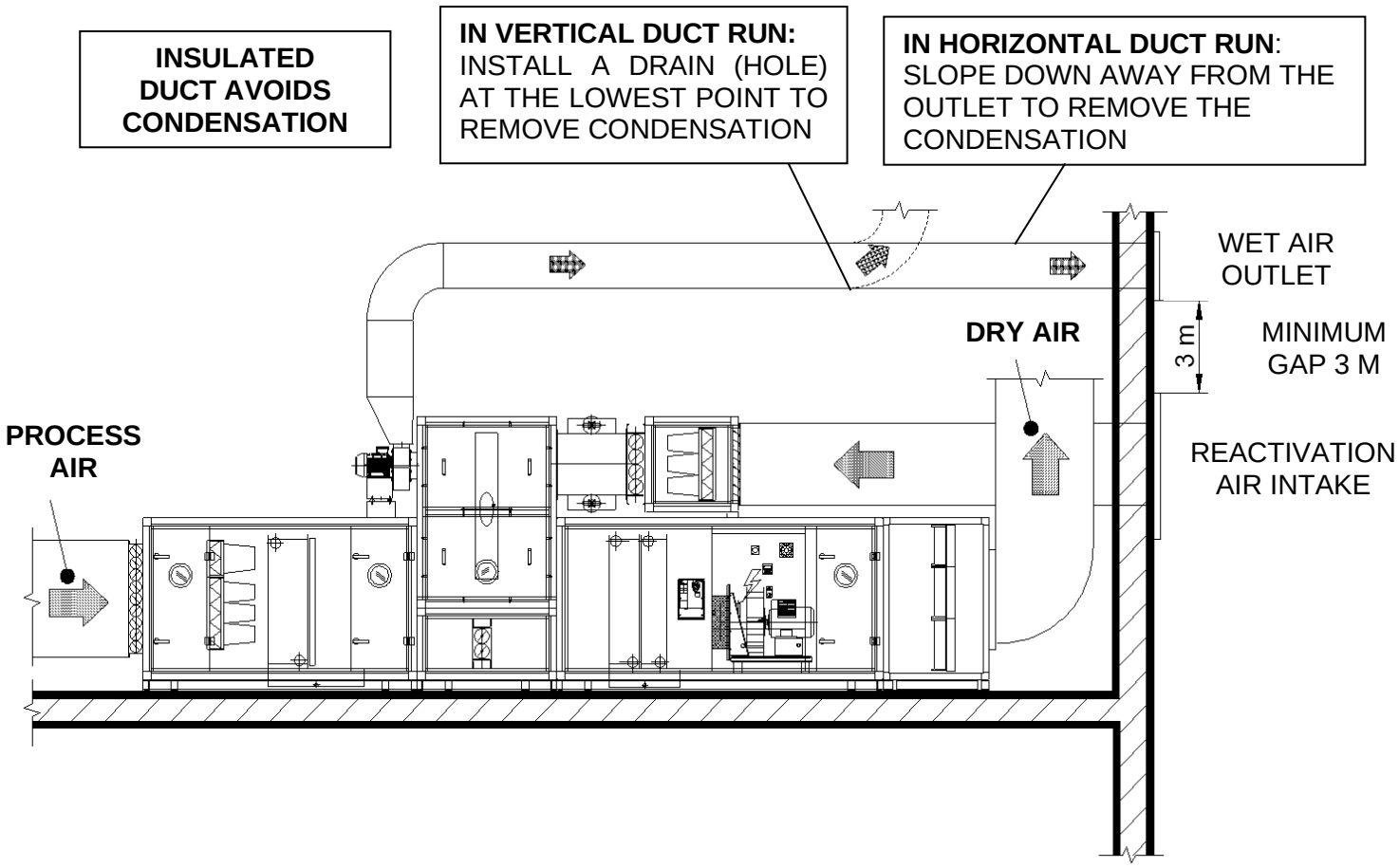
- DFLEX-E and DFLEX-V service area dimensions:



- DFLEX-G service area dimensions:



9.3 Air ducts



In general, the equipment installer knows the sizing and layout process for air transport ducts for any type of air conditioning, and that process is applicable to a dehumidifier. However, the following points are important:

- Ensure that the pressure available to the fans has been considered when designing the correct size of the ducts, so the equipment can operate at nominal flow rates.

- The equipment has control dampers in the suction of both air circuits, for isolation during inactivity and to adjust the available fan pressure.

- The outside air intake must be protected (by grids or mesh) to protect against entry of foreign matter, e.g. leaves, insects and rainwater.

- The external air intake and the wet air outlet must be kept separate (minimum 3m) so as not to affect the equipment performance.

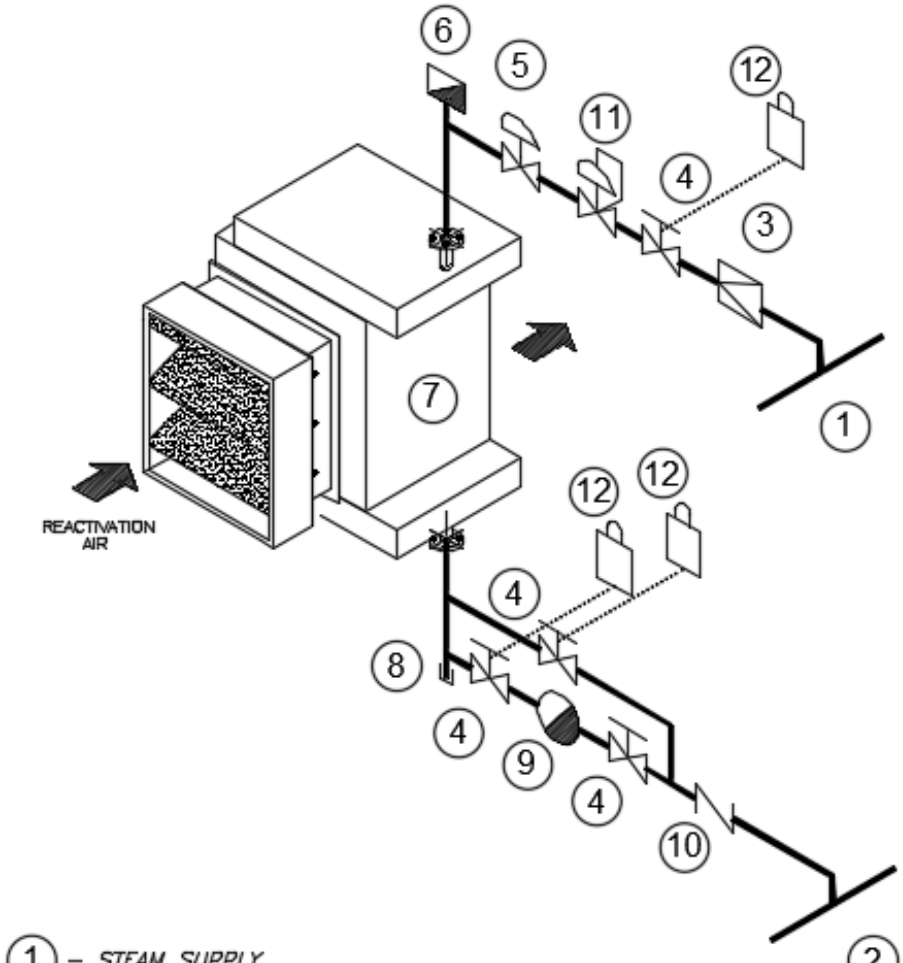
- Provision must be made for the removal of any cooled condensation produced in the wet air duct during operation. This can be achieved by ensuring a downward inclination towards the outside, for horizontal ductwork. Ensure that upward slopes are adequately insulated or drill a hole larger than 5mm at the lowest point to remove any condensation. This prevents it returning to the unit or restricting airflow inside the duct.

9.4 Connecting thermal fluids: steam reactivation battery

For models with a reactivation battery for steam, thermal oil, superheated water or gas, the thermal fluid supply must be connected according to the regulations applicable in each case and according to good practice.

The fluid transport pipes will carry de-aerators, traps, filters, cut-off valves and measuring instruments suitable for the type of battery supplied.

The recommended assembly scheme for steam batteries is attached:



1 – STEAM SUPPLY
2 – CONDENSATE RETURN
3 – Y–FILTER
4 – MANUAL SHUT–OFF VALVES.
5 – PROPORTIONAL REGULATION VALVE.
6 – THERMOSTATIC DEAERATOR.
7 – STEAM HEATER COIL.
8 – DROPLET WELL.
9 – STEAM TRAP.*
10 – RETENTION VALVE.
11 – PRESSURE REGULATION VALVE.
12 – LOTO OPTIONAL DEVICE

Model	AIR Q [Nm3/h]	Power [kW] at Absolute Pressure of...				Steam mass rate [kg/h] at Absolute Pressure of…			
		3 bar	4 bar	5 bar	6 bar	3 bar	4 bar	5 bar	6 bar
DFLEX-1100	2250	54,14	66,21	83,24	101,46	91,352136	111,7191	140,46	171,20
DFLEX-1300	2700	60,80	79,13	98,51	119,67	102,59022	133,5203	166,22	201,93
DFLEX-1700	3600	94,60	117,14	137,16	160,25	159,62434	197,6583	231,44	270,40
DFLEX-2100	4500	115,77	142,28	166,77	195,06	195,346598	240,0796	281,40	329,14
DFLEX-2900	6000	166,47	200,94	232,04	267,94	280,897778	339,0625	391,54	452,12
DFLEX-3500	7200	195,73	235,57	272,46	315,07	330,271102	397,4971	459,75	531,65

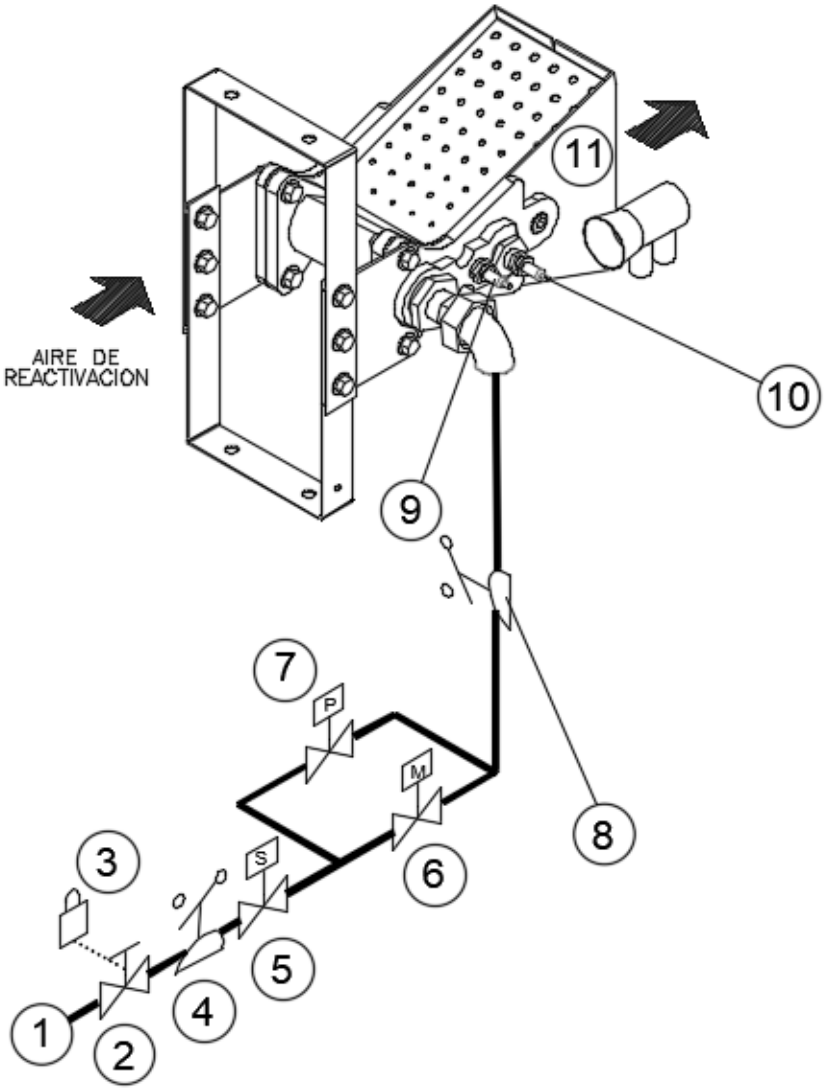
Nominal working pressure: 6 bar (absolute).
For steam without anticorrosion protection additives, we recommend a stainless-steel reactivation air heater with aluminium fins.
(*) A float type, thermostatic trap, or one with an inverted cover, is recommended (minimum 3m separation). Safety factor for condensate loading, 3 to 1, i.e. it must be able to purge a nominal mass equal to 3 times the steam consumption at 6 bar (last column).

9.5 Connecting the gas supply to the gas reactivation heater

Models with a gas reactivation heater must be connected to the gas supply according to the regulations applicable in each case and according to good practice.

The recommended assembly diagram for the fuel gas burner supply is attached:

GAS BURNER INSTALLATION SCHEME



1) NATURAL GAS / LPG LINE
2) GAS SUPPLY CUT OF VALVE
3) LOTO OPTIONAL SUPPLY DEVICE
4) MINIMUM GAS SAFETY PRESSURE SWITCH
5) DOUBLE SAFETY VALVE IN SERIES
6) GAS FLOW CONTROL VALVE WITH MODULATING SERVOMETER
7) PILOT SOLENOID VALVE (OPTIONAL)
8) MAXIMUM GAS SAFETY PRESSURE SWITCH
9) IGNITION ELECTRODE
10) IONIZATION PROBE FOR FLAME SUPERVISION
11) AIR DEFLECTORS

Nominal values according to model:

MODEL	1100	1300	1700	2100	2900	3500
Atm pressure	1013,25mbar	1013,25mbar	1013,25mbar	1013,25mbar	1013,25mbar	1013,25mbar
q(v) air ±5%	2250Nm³/h	2700Nm³/h	3600Nm³/h	4500Nm³/h	6000Nm³/h	7200Nm³/h
Feed pressure	40-60mbar	40-60mbar	40-60mbar	40-60mbar	40-60mbar	40-60mbar
q(v) Natural gas	9,0Nm³/h	10,5Nm³/h	14,0Nm³/h	16,0Nm³/h	22,0Nm³/h	29,0Nm³/h
q(v) Propane gas	3,7Nm³/h	4,5Nm³/h	5,9Nm³/h	6,6Nm³/h	8,8Nm³/h	11,7Nm³/h
Chamber pressure	-150Pa	-150Pa	-150Pa	-150Pa	-150Pa	-150Pa
Diaphragm	310 x 310	310 x 350	310 x 375	500 x 325	500 x 370	700 x 335
Air/Gas Pressure Diff	1,5 / 5,0 mbar	1,5 / 9,5 mbar	1,5 / 12,5 mbar	1,5 / 7,0 mbar	1,5 / 12,5 mbar	1,5 / 12,5 mbar
Max. Power	95kW	115kW	150kW	170kW	225kW	300kW
Flame length	375mm	450mm	600mm	450mm	600mm	600mm
Min. Power	15kW	15kW	15kW	22,5kW	22,5kW	30kW
Flame length	10mm	10mm	10mm	10mm	10mm	10mm

9.6 Connecting thermal fluids: additional batteries

If your equipment has additional water batteries, the water supply must be connected according to applicable regulations and good practice by connecting the inputs and outputs according to the corresponding battery labels:

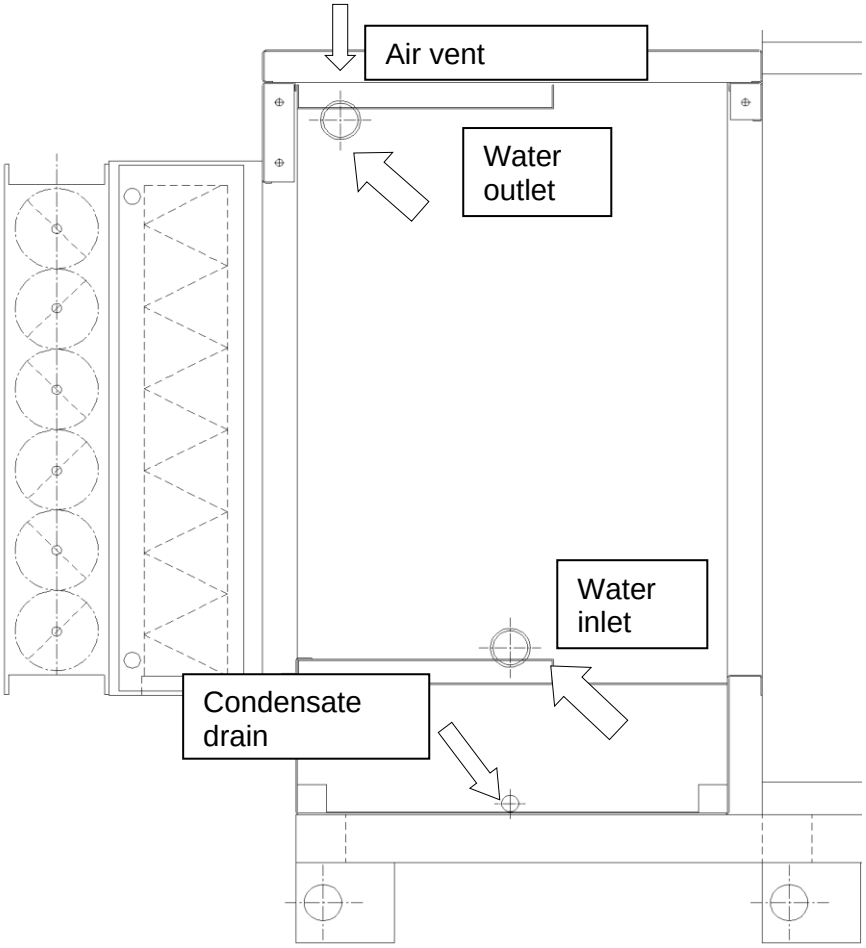


Figure 10: Pre-cooling battery connections.

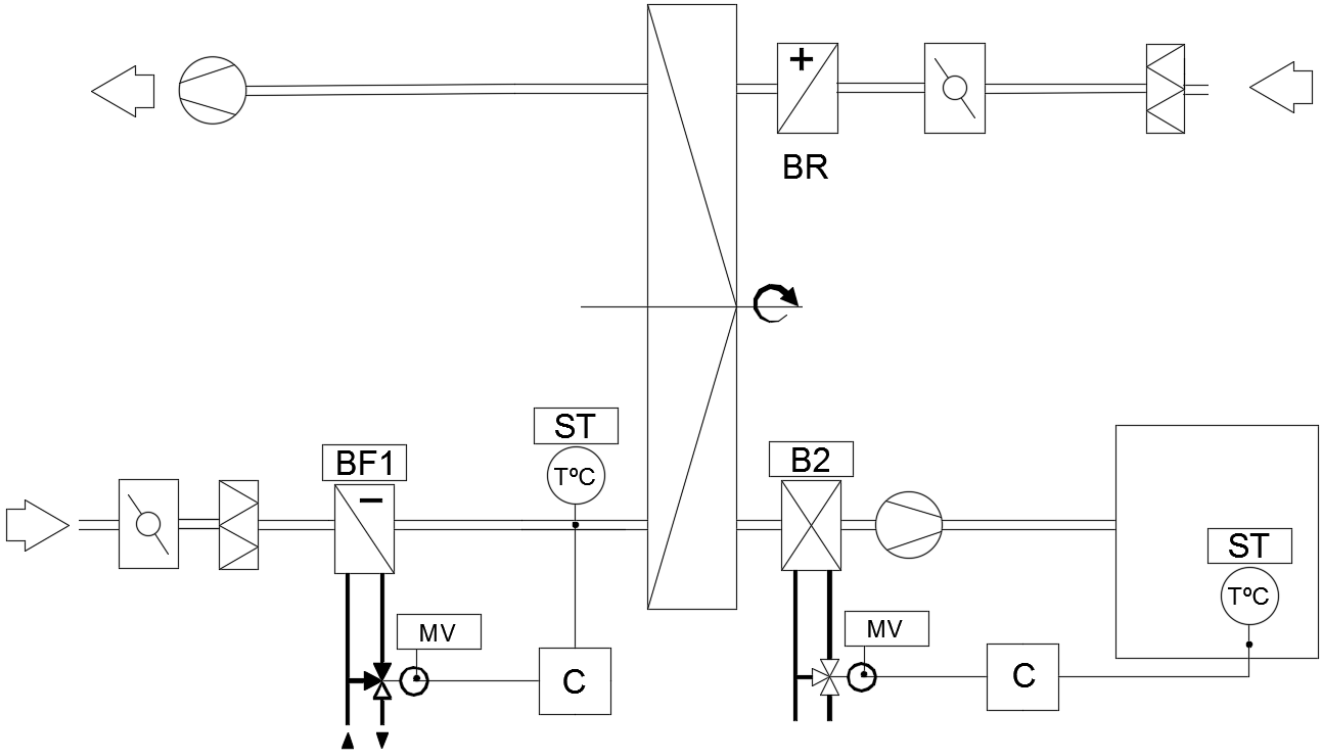
Water battery features:

- Standard supply includes air/water heat exchangers with copper tubes and aluminium fins.
- The nominal values for cooling batteries are calculated with a standard temperature jump in water of 5°C, entering at 7°C and exiting at 12°C.
- For heating batteries, the nominal values are calculated with a standard temperature drop in water of 20°C, entering at 70°C and exiting at 50°C.
- For calculating non-standard performance, please contact your FISAIR dealer.

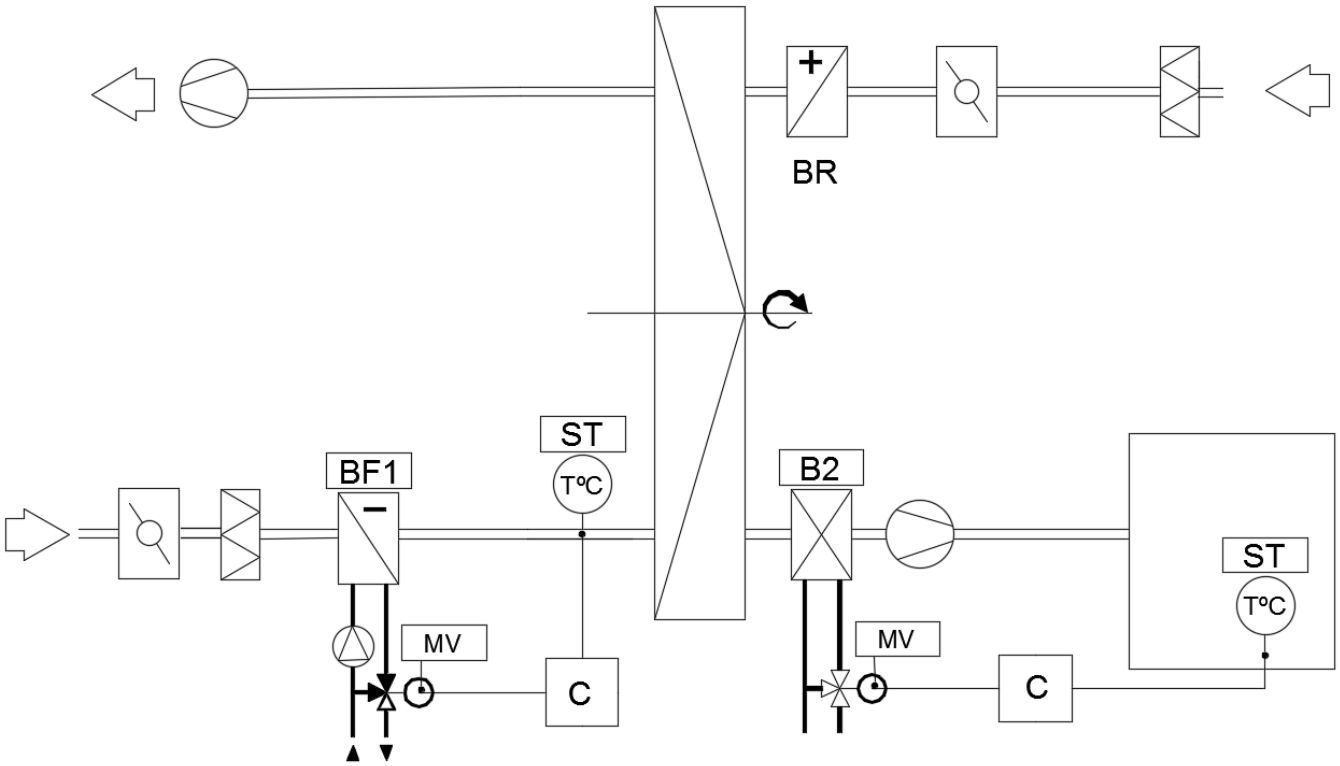
NB. Ensure that the air to be treated does not contain aggressive components that may react with copper or aluminium.

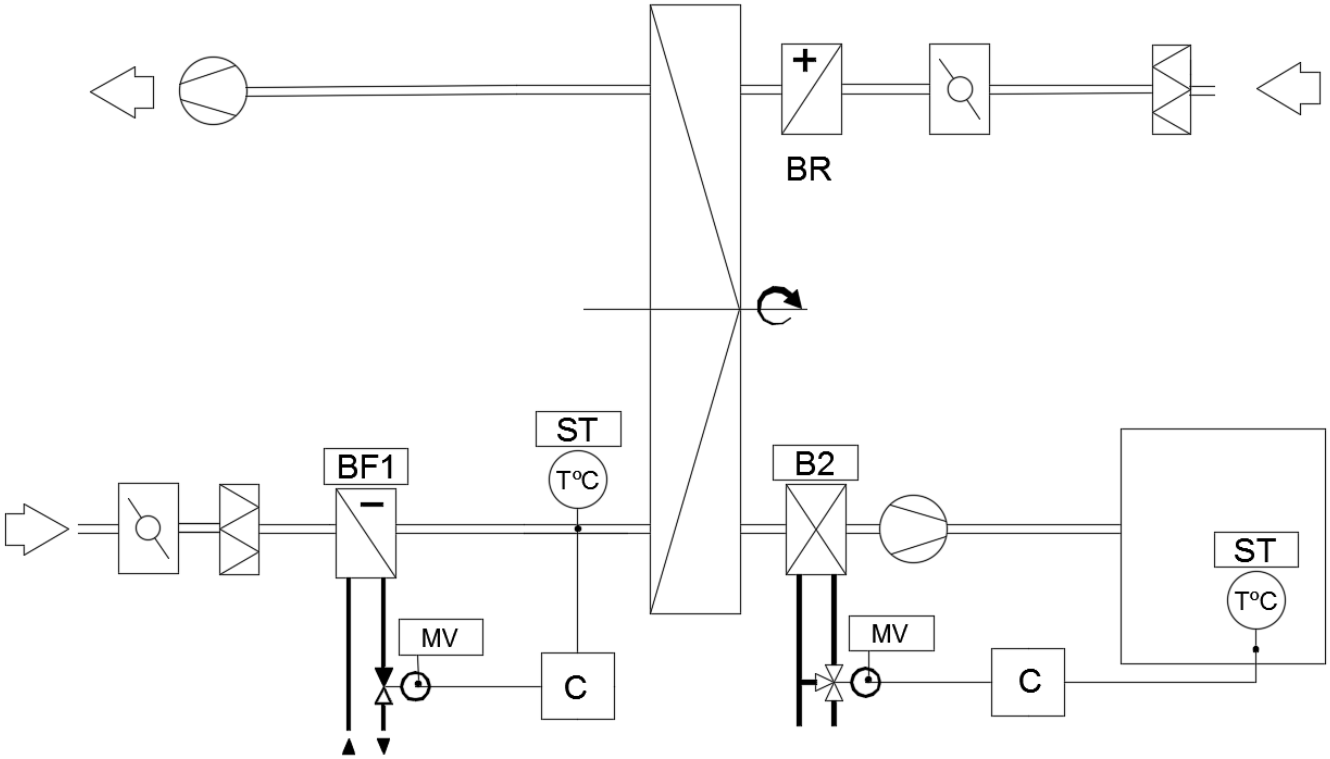
Simple connection diagrams recommended for pre-cooling and post-cooling/heating batteries.

Typical installation for constant flow:



Typical installation for constant flow with water + glycol for risk of condensed water freezing on the surface of the heat exchanger:





- BF1: Pre-heating battery
- BR: Reactivation battery
- B2: Post-heating/cooling batteries.
- ST: Temperature probe
- C: Temperature controller. Sends a signal to the motor if adjustment is required.
- MV: Motor-valve operated by controller.

9.7 Connection to the mains power supply

Attention, Live Current

This equipment operates at high electrical power and voltages and must be connected to the mains power supply by qualified personnel only. This must be in accordance with local Electrical Standards and Regulations.

Before doing anything with the unit's electrical board, check that all moving parts are working freely.

All of the values displayed on the specifications and characteristics plate must be checked carefully to ensure that the unit is correctly protected and connected. The electric diagram number corresponding to the equipment is on the ratings plate. Keep the electric diagram available during the electrical wiring process.

The equipment must be connected to the mains network by a line protected against short circuits and earth faults in the cables, whose cross section and sensitivity must correspond to the equipment power and power line length.
The line can be designed with the nominal equipment power and current, whose values appear on the ratings plates and wiring diagram.

The supply voltage (for standard equipment) is 3-phase and must be between 380V and 415V to operate at a frequency of 50Hz. For other kinds of connections contact the manufacturer.

The line connection must be made at the power terminals of terminal block X1 (PE-L1-L2-L3) or directly on the terminals of the circuit breaker (depending on the model).

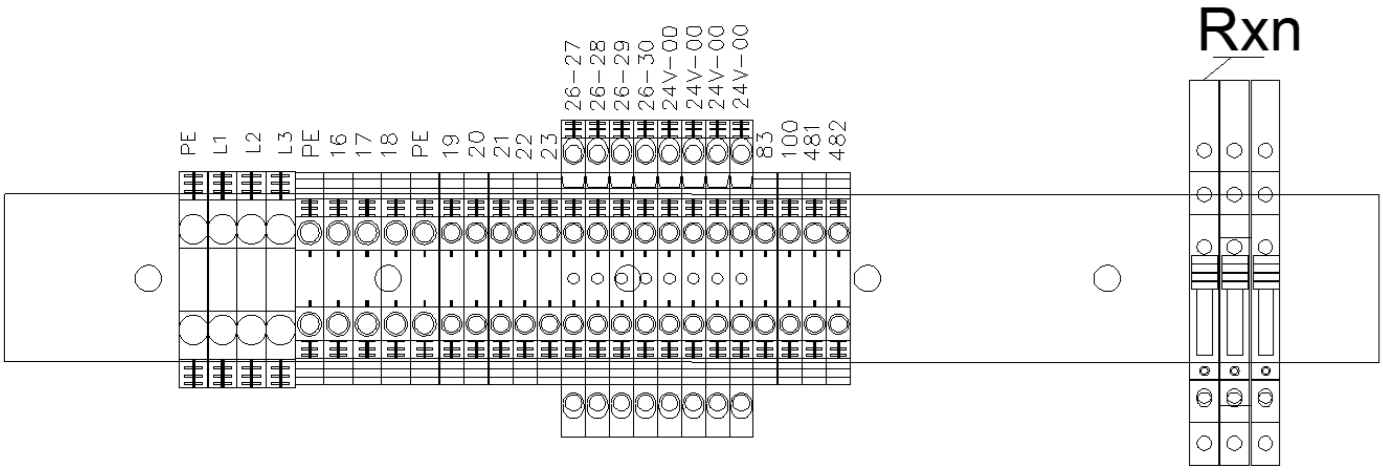


Figure 11: Terminal block X1 for DFLEX series without PLR.

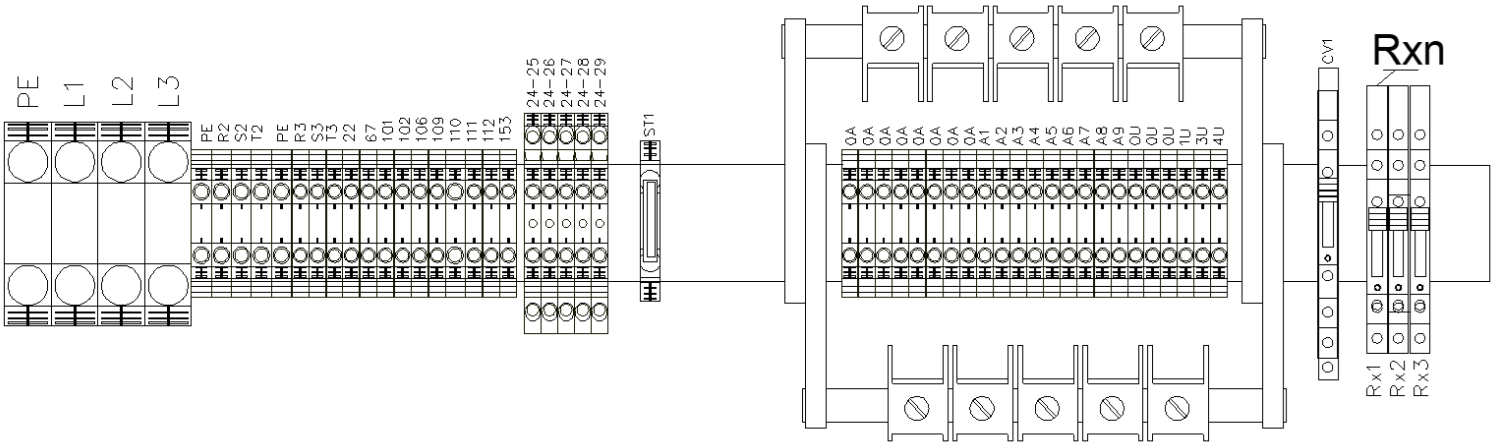
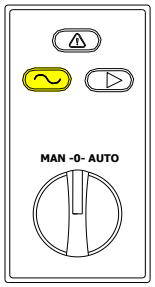


Figure 12: Terminal block X1 for DFLEX series with PLR.

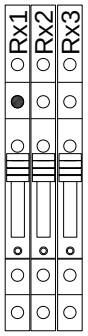
9.8 Control and signalling connections

All equipment with a Fisair electric control panel has the remote signalling card SEF-013, which provides remote information about the equipment status.

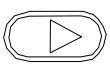
The SEF-013 consists of 3 relays (NC-NA) identified on the terminal block as Rx1, Rx2 and Rx3. There is a correspondence with the SEF-013 remote signalling card and the local signalling card SEF-004, located on the front of the electrical panel.



Signalling card
SEF-008



Remote signalling
Card SEF-013

	Rx1	Signal for "live equipment"
	Rx2	Signal for "equipment in operation"
	Rx3	Signal for "fault/alarm"

Location and operation of Hn interlocks:

Interlock	Without PLR	With PLR
		All configurations (S,P,M)
H1	Terminals 22-23	Terminals 24-27
H2	Terminals 24-25	Terminals 24-28
H3	-	Terminals 24-29

I2	1	2	H1	H2	H3	Ventilación *Air flow*	Calentador BR *Heater BR* n%/PnkW
0			—	—	—	OFF	0
MAN			—	—	—	ON	100%
AUTO						OFF	0%
AUTO						ON	0%
AUTO						ON	CONF. "S" 100%-VALOR H3%
AUTO						ON	CONF. "S" VALOR H3%
AUTO						ON	CONF. "S" 100%
AUTO					—	ON	CONF. "P" VALOR X1: A2%
AUTO					—	ON	CONF. "M" 0..100%
AUTO						ON	CONF. "S" 100%
AUTO						ON	CONF. "S" VALOR H3%

If the equipment has PLR, please refer to the MMCSX (DFLEX Series Operating and Control Manual) for more information, as the operations of the different interlocks depend on the selected configuration.

9.9 Flow adjustment

Steps for adjusting the process air flow (if the differential pressure sensor is not available):

1) Measure the differential pressure with a pressure gauge on the differential pressure ports located on the side of the basic unit (module 4).
2) By opening and closing the damper, the process air pressure drop is established according to the corresponding values in the pressure drop table to obtain the nominal process air flow.
3) Repeat steps 1 and 2 for the reactivation air.

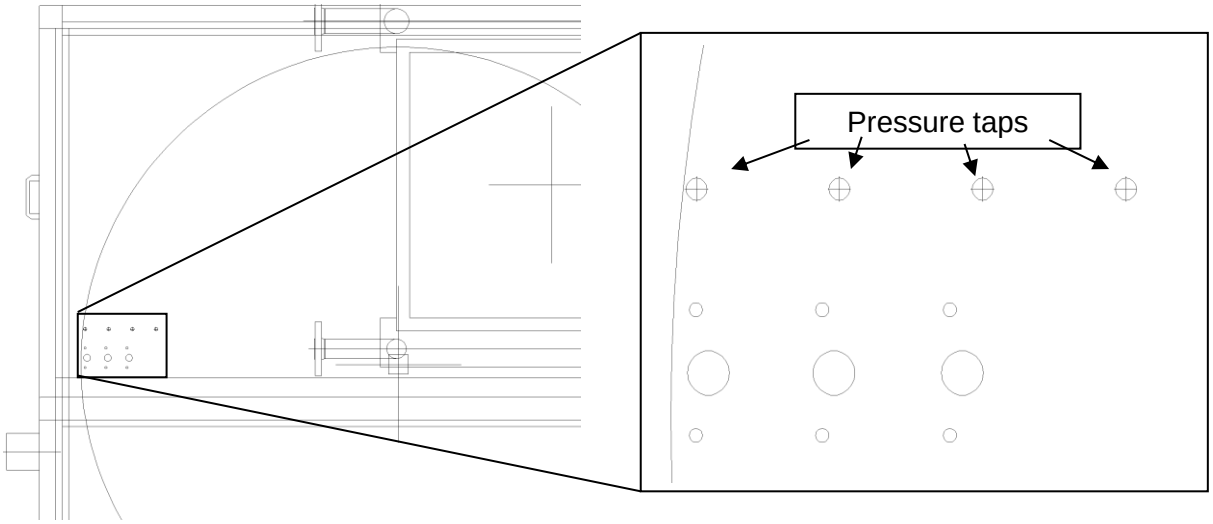


Figure 5: Side-view of module 4.

The data in the following table are valid for the following air conditions:

Air at inlet, temperature 20°C
Air at inlet, relative humidity 60%

Model	Process air flow	Process air pressure drop across rotor	Reactivation air flow	Reactivation air pressure drop across rotor
	m^3/h	Pa	m^3/h	Pa
DFLEX-1100	7500	177	2250	236
DFLEX-1300	9000	225	2700	293
DFLEX-1700	12000	179	3600	238
DFLEX-2100	15000	242	4500	313
DFLEX-2900	20000	184	6000	244
DFLEX-3500	24000	235	7200	305

If there is a differential pressure sensor and the equipment has advanced control, the PLR will adjust the process air flow rate.

IMPORTANT: The reactivation fan has been designed to overcome a certain pressure or load loss. If this pressure or load loss is low, the closing of the reactivation damper for adjusting the nominal flow rate could produce areas of excessive heating in the elements of the heater. This generates a lower drying efficiency of the DFLEX and possible damage to the metallic and plastic surfaces of the equipment. In this case, please use external elements (such as regulation gates or flow control diaphragms) downstream of our wet air fan. Don t close the damper below 35º.

9.10 Differential pressure sensor:

The differential pressure sensor is located on the dry air fan module. Before starting the equipment, the pipes connected to this sensor must be correctly configured. This arrangement depends on the pressure differential to be measured, either between the plenum and suction side of the fan (pressure difference for calculating volume flow), or between drive plenum and P.atm (Pa). The following figure shows the sockets to which each tube must be connected:

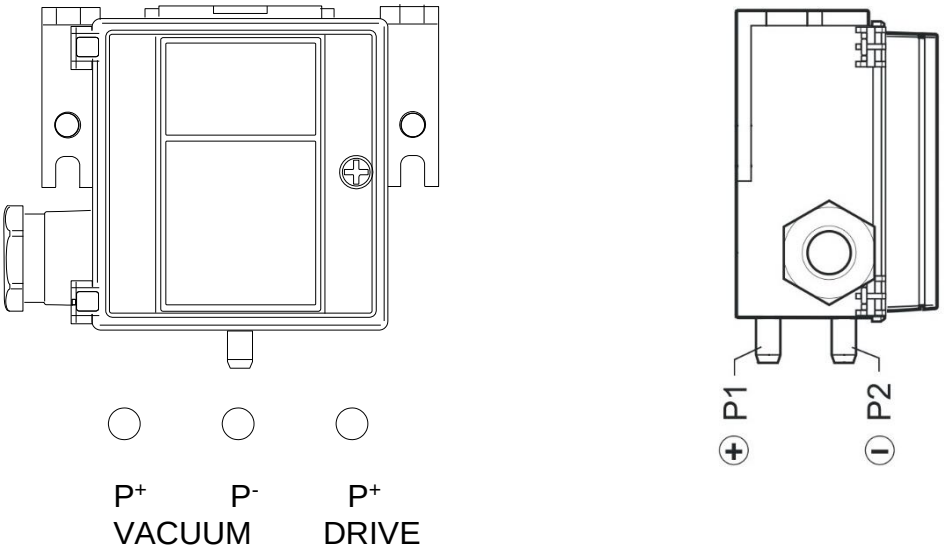


Figura 6: Differential sensor

The corresponding connections for measuring flow volume or drive pressure are shown next to the switch position:

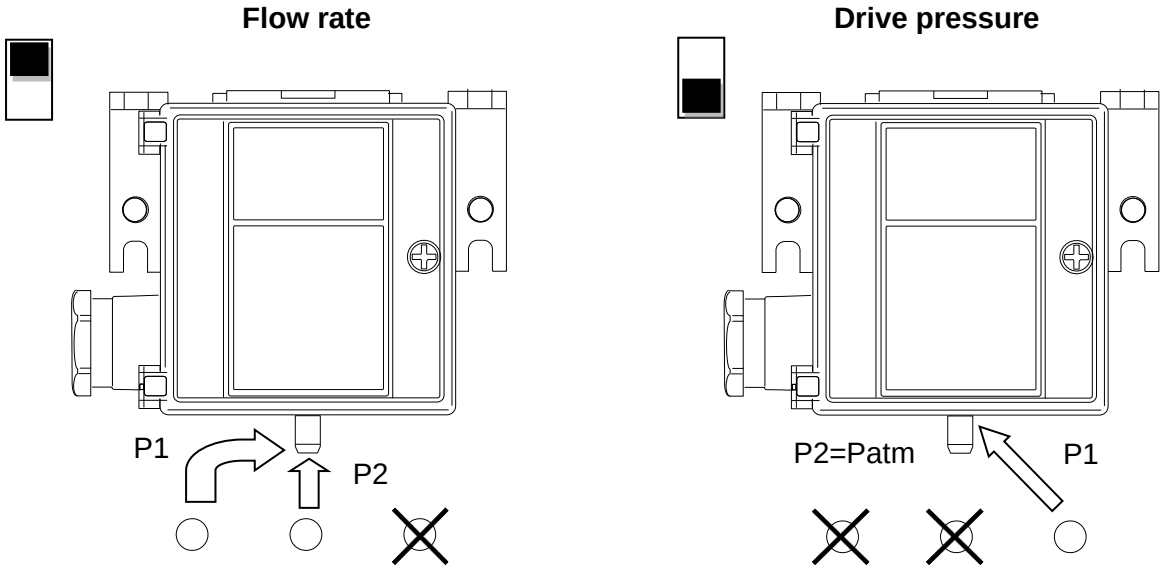


Figure 7: Connections of the tubes to the sensor

Calculation of the flow through the differential pressure of suction of the fan

In case of wanting to calculate the flow having configured the control mode Pressure, and whenever the fan is a Plug-fan type, it can be done with the following expression:

$$Q = k * \sqrt{\frac{1.2}{\rho} * \Delta P}$$

Where:

- Q stands for the air flow in m^3/h
- ρ is the density of the air through the fan, in kg/m^3
- ΔP is the differential pressure in Pa measured between the suction plenum of the fan and its inlet ring.
- k is an intrinsic constant of each fan.

The *k* values for each DFRA model are the following:

DFLEX Model	1100	1300	1700	2100	2900	3500
K Value	252		381		620	

9.11 Frequency inverter parameters:

Depending on the model, the frequency inverter for the process air fan will have different values in its parameters. The values change for these three configurations:

- Advanced control (A***). Always incorporates the differential pressure sensor.
- Basic vapour control (BV00). Without differential pressure sensor.
- Basic vapour control (BV02). With differential pressure sensor.

	A****	BV00	BV02
Parameter	Value		
FN0d	1	2	2
F207	1	2	2
F213	N/A	FQn (Hz)	FQn (Hz)
F360	0	0	1

Where FQn is the nominal frequency for the fan. It can be adjusted in the frequency inverter parameter F213. The main isolator I1 must be switched on to do this.
By changing FQn value, the flow rate of the process air will vary (increasing the frequency will increase the flow rate). The FQn value entered on the frequency inverter must lie between the following range:

Model	Fan type	FQn range (Hz)
DFLEX-1100	Standard Fan	[40-73]
	Powered Plug Fan	[40-76]
DFLEX-1300	Standard Fan	[40-76]
	Powered Plug Fan	[30-54]
DFLEX-1700	Standard Fan	[30-54]
	Powered Plug Fan	[30-58]
DFLEX-2100	Standard Fan	[30-58]
	Powered Plug Fan	[25-48]
DFLEX-2900	Standard Fan	[25-48]
	Powered Plug Fan	[25-50]
DFLEX-3500	Standard Fan	[25-50]
	Powered Plug Fan	[25-43]

For the advanced configuration (PLR), please refer to the MMCSX (DFLEX Series Operating and Control Manual) since more parameters are to be changed.

10. Commissioning.

Once the equipment has been connected to the air ducts and mains power supply, as well as the thermal fluids and/or control elements, where appropriate, the equipment commissioning process should be done as follows:

Firstly, identify the PLR (Programmable Logic Relay) on the control panel and/or wiring diagram. The integration of the PLR in the equipment provides quicker, more precise, more reliable and easier operation of the management and supervision of the dehumidifier.

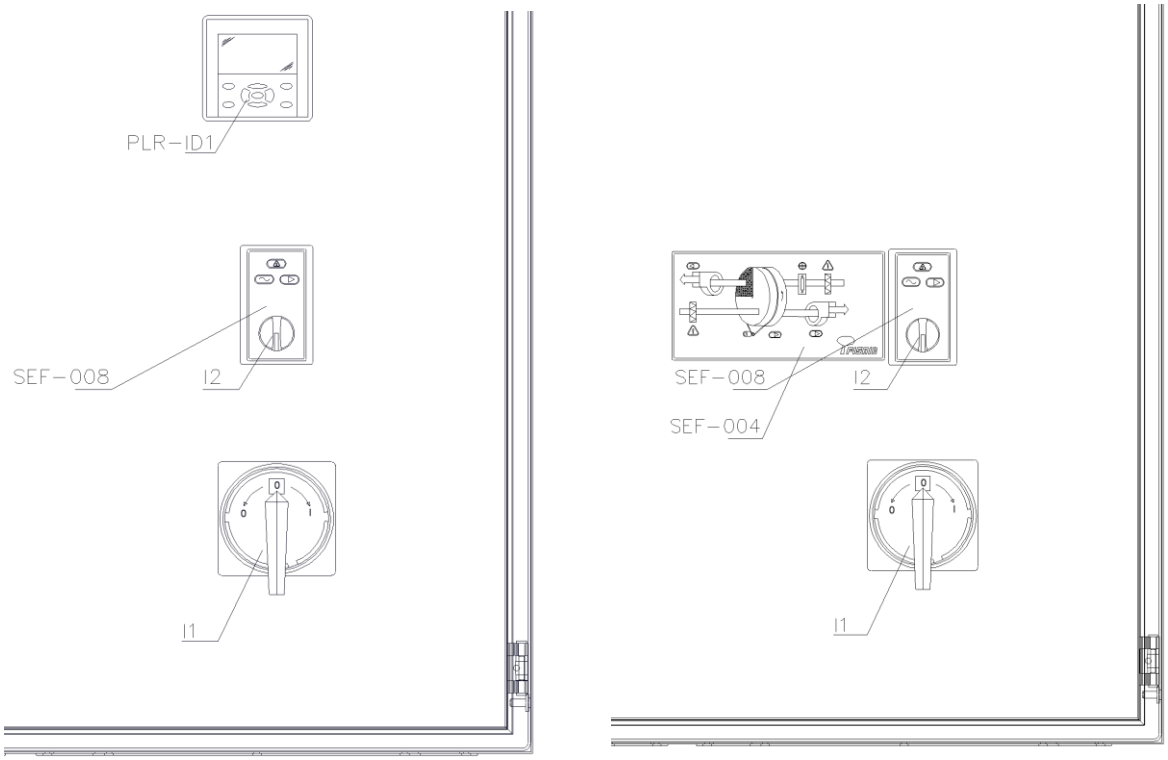


Figure 13: Types of control panels

I1 Isolator switch (depending on model and size).

I2 MANual / 0 / AUTOmatic switch.

SEF-004 Status signalling board (live, on and fault), and operation signals for process fan, reactivation fan, rotor rotation (on request), heater (on request) and blocked filter alarm (upon request).

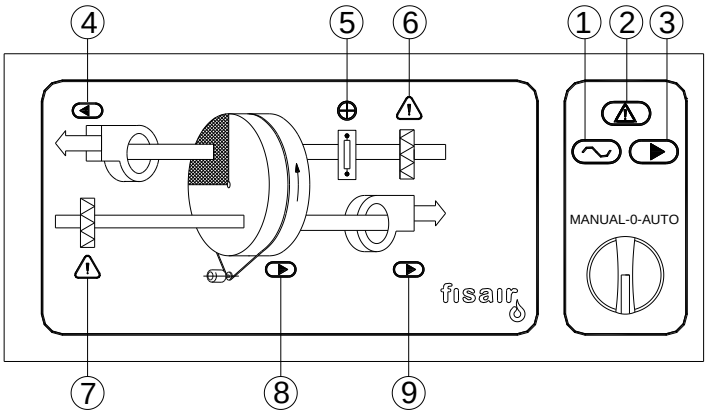
SEF-008 Status signalling board (live, on and fault).

PLR Programmable logic relay with backlit, black-and-white, LCD screen measuring 63x32mm and navigation keyboard.

If the equipment has PLR, please refer to the MMCSX (DFLEX Series Operating and Control Manual) to start the equipment.

Otherwise, follow the instructions below:

1) Set switch I1.
2) Move the I2 switch to the selected position (manual or automatic) to start the dehumidifier.
3) The SEF-004 status signal card is as follows:



1	Yellow - equipment is live.
2	Red - alarm/fault/equipment failure.
3	Green - equipment is running.
4	Green - reactivation motor-fan is operating.
5	Red - reactivation battery is operating (optional).
6	Red - reactivation air filter pressure switch. Clogged filter (optional).
7	Red - air filter pressure switch. Clogged filter (optional).
8	Green - rotor spokes rotating (optional).
9	Green - process motor fan is running.

To operate the PLR, refer to the MMCSX (Operation and Control Manual Series DFLEX) to start the equipment.

4) If it is the first time the equipment has been used:
   - Check that the flow control dampers are at least 50% open.
   - Check the direction of rotation of the motor fans (blades forwards).
   - If they are rotating in the reverse direction, set switch I2 to position 0, wait for the equipment to stop, switch off the isolator, disconnect the equipment supply line and reverse the two supply line phases to change the fan motor rotation direction.
   - Re-start the equipment.
   - It should be checked that the current absorbed by the motor fans and by the reactivation battery in the DFLEX case are in accordance with the nominal values.
   - Adjust air flow rates, if necessary. The nominal reactivation air flow rate with the standard heating battery must reach a temperature of approximately 100°C above its inlet temperature. Thus, the equipment thermometer reading can be used as a guide to adjust the reactivation flow rate.
   - After the equipment has reached its operating levels (at least 30 minutes), make the relevant temperature and humidity measurements.
   - It is very important to verify the direction of rotation of the rotor (shown in figure 1 of section 4). For this purpose, there is a small window located on the front wall of the basic unit, which allows viewing of the inside of the equipment.
     IMPORTANT: It is possible that the direction of rotation can change with each ignition if the capacitor is damaged, the electric wiring is defective or there is an unstable connection of the intermediate wiring. Repair the defect immediately and do not start the DFLEX if the direction of rotation is incorrect.
5) In manual mode, stop the equipment using the switch I2 locally.
6) In automatic mode, switch off the device via the I2 switch locally or by using the H1 interlock remotely.
   If the equipment has advanced control (with PLR), the reactivation fan and the rotor motor shutdown will be delayed 5 minutes to dissipate the heat of the reactivation elements.
   If the equipment has basic control (without PLR), the shutdown of the process air fan, reactivation air fan and the rotor motor is delayed 5 minutes to dissipate the heat of the elements of reactivation only in equipment with electric heater.

11. Maintenance

The following service table is for guidance only, as the frequency will depend on the conditions of each installation.

ACTION	**FREQUENCY**
Cleaning the filters	According to the dehumidifier's instructions.
Inspection of the wet air fan impeller(reactivation)	Every 2000 hours of operation
Inspection of the dry air fan impeller (process)	Every 2000 hours of operation
Internal inspection (desiccant rotor surfaces, tension belt, presence of foreign bodies, etc.	Every 8900 hours of operation.
Desiccant rotor inspection	Every 1500 hours of operation.
Electrical connections	Every 2 months
Heat recovery module inspection (plates)	Every 2000 hours of operation.
Belt inspection/replacement, if applicable	Every 2000 hours of operation.
Rotor seals inspection/replacement, if applicable	Every 2000 hours of operation.

11.1 Maintaining the dessicant rotor

The desiccant rotor is the only component of the dehumidifier that needs special attention.

The desiccant rotor fitted to these units does not require specific ongoing maintenance. The speed of rotation is very slow, and the bearings and desiccant material are designed for continuous operation. It is however very important to check the drive system on a regular basis to ensure it is working correctly, as this has a direct impact on the air-drying process.

The main constituent in the process of water vapour adsorption (silica gel) traps the water vapour molecules inside the tiny pores (micropores and mesopores) on the rotor surface in the process air circuit and releases them into the reactivation air circuit.
The operating process is not affected by normal ambient conditions as the rotor is made from inert fireproof material. Only the presence of organic compounds with a molecular size similar to that of water can affect the unit's drying capacity. It is therefore important to clean it on a regular basis.

Procedure for washing the silica gel desiccant rotor

The desiccant rotor fitted to the unit has the advantage over a hygroscopic salt desiccant rotor (Lithium Chloride) that it can be washed with water.
Normally, ordinary dust particles must be removed with a vacuum cleaner when necessary. The frequency of cleaning will depend on the type of installation and workload to which the dehumidifier is subjected.
In cases where the vacuum cleaning is insufficient to eliminate dust and dirt, the rotor can be rinsed with water following these steps:

1) Remove the rotor from the dehumidifier. Disassemble its drive shaft and bearings, which must be reinserted in their original position after they have been washed.
2) Prepare water in a container that is large enough to immerse the rotor in for washing and prepare the rotor so that it can be immersed by moving it vertically downwards.
3) Immerse and remove the rotor from the water tank two or three times. Let the water run off completely while it is held in a raised position so that any materials that have been dissolved in the water are removed.
4) Once this process is complete, gently blow the rotor channels with compressed air to expel any remaining water on the rotor.
5) Return the rotor to its position in the dehumidifier, securing its drive shaft, bearings, and sealing joints.
6) Turn the rotor and dry it with the fans without switching on the reactivation heater for approximately 30 minutes.
7) Complete the rotor drying process by switching on the reactivation heater.

11.2 Maintenance of air filters

The standard DFLEX dehumidifier has two air filters, one to filter the reactivation air intake and the other to filter the process air.

It is important to keep both filters clean (either by washing them correctly or by replacing them), since dirty filters will affect the dehumidifier's performance.

Follow these steps when cleaning or replacing the filters:

1) Turn off the dehumidifier and wait for it to cool down.
2) Extract the filters from the unit.
3) Wash the filters using neutral pH soap and water or replace them.
4) Only replace the filters when they are completely dry.

Always use FISAIR filters or filters with equivalent properties.

12. Declaration of conformity

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/ Uranio, 20 (Pol. Ind. Aimayr)
28330 San Martín de la Vega (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: **DFLEX**

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.

Hugo J. López Álvarez
-Quality Manager-
San Martín de la Vega, junio 2020

Rev01

13. Guarantee

FISAIR S.L.U. WARRANTY POLICY

Quality Department
Departamento de Calidad

FISAIR S.L.U.
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.
c) Components and/or manufactures are affected or damaged by the effects of corrosion (gradual wear of the metal bodies by the action of external actors not controlled by FISAIR).

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.

FISAIR S.L.U. WARRANTY POLICY

Quality Department
Departamento de Calidad

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.

Quality Manager:

Hugo J. López Álvarez
San Martín de la Vega, February 2016