Precision Cooling for
Business-Critical Continuity

Liebert® PDX

40-120 kW Indoor Room Cooling Units with Modulating Capacity

A/W/F/D/H Versions

PRODUCT DOCUMENTATION

Liebert PDX – PD – 265200 – 29.07.2013

EMERSON
Network Power

Introduction

Liebert® PDX

Liebert® PDX direct expansion cooling unit is equipped with the most advanced industry technology, guaranteeing precise cooling of data centers and server rooms.
It comes filled with R410A refrigerant which allows the unit to reach significant levels of efficiency. This series offers units with gross rated cooling capacity from 40 to 120 kW.

Liebert® PDX range comes equipped with latest EC Fans technology thus ensuring top energy efficiency. The complete unit design has furthermore been optimized with enhanced heat exchangers, delivering a high level of overall efficiency and cooling capacity.
In addition, Liebert® PDX also includes as option unique Digital Scroll technology, making it the ideal, scalable cooling system able to expand with evolving business needs. The Digital Scroll modulating capability greatly contributes to the efficiency levels reached by Liebert® PDX with a 50 kW unit (inclusive of Digital Scroll) consuming as little as a 10 kW unit, thus delivering advantageous energy savings.

All Liebert® PDX's components have been optimized to provide an extremely efficient solution both for conventional computer rooms and for infrastructures facing the challenges of modern IT applications.

Two type of units are available: Liebert® PDX **Standard Height** (height 1970mm), and Liebert® PDX **Extended Height** (total height 2570mm) that it will be supplied in two modules connectable on the field. To allow maximum versatility and high efficiency both type of Liebert® PDX are available in four air discharge versions: **Upflow**, **Downflow Frontal** and **Downflow Up** with fans module installed above the raised floor, and version **Downflow Down** with fans module installed in the raised floor.

The new Liebert® PDX range is available across a full range of cooling modes: direct expansion, Indirect water Freecooling, Direct Air Freecooling and dual fluid redundancy cooling.

Liebert® PDX Standard Height

Liebert® PDX Extended Height

Contents

The Quality Management System of Emerson Network Power S.r.l. High Performance Air Conditioning has been approved by Lloyd's Register Quality Assurance to the standard ISO 9001:2008

The product conforms to European Union directives 2006/42/EC; 2004/108/EC; 2006/95/EC; 97/23/EC.
Units are supplied complete with a Test Certificate Conformity Declaration and Component List.

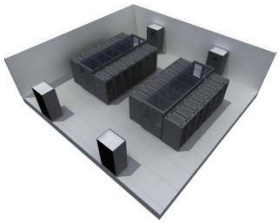
Liebert® PDX units are CE marked as they comply with the European directives concerning mechanical, electrical, electromagnetic and pressure equipment safety.

1 Liebert® PDX Top Efficiency

The new Liebert® PDX

Liebert® PDX is Emerson Network Power answer to the latest and the future Data Center needs. Data Center environment is growing constantly in terms of cooling needs. It is asking and will continue to increase its demand for cooling solutions that provide exactly what the servers need without wasting energy overcooling as well as avoiding hot spots, Liebert® PDX thanks to usage of Stage Coils is designed to maximize the efficiency at part loads.
In fact as the outside conditions change all year long, as well as considering common cooling redundancy the units work most of the time in part load. Liebert® PDX provides a top efficient solution at full load, and maximizes its benefit at part load conditions.
The presence of Digital Scroll is then an additional step to further improve the part load efficiency.
Liebert® PDX has been designed to set new efficiency targets on Direct Expansion Data Center need applications.
Therefore all parts of common CRAC unit have been studied and optimized to provide a top efficient solution.

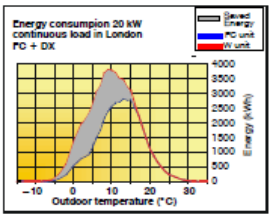
Smart Aisle™ Solution – When Smart Means Efficient



Liebert® PDX as part of Smart Aisle™ cooling solution is the best answer to ensure the right cooling minimizing the cooling operating costs.
Emerson Network Power's cold aisle containment solution, can achieve an energy saving of up to 65% higher than other manufacturers' cooling units with standard technology. The intelligent control of the Digital Scroll compressor's capacity together with accurate fan speed management, driven by cold aisle conditions, guarantees increased savings.
Smart mode is a control algorithm developed for Smart Aisle™ applications (Cold Aisle containment) meeting the cooling and airflow needs of the servers without wasting a single Watt on unnecessary cooling or air movement.
Liebert® PDX with Digital Scroll delivers the exact level of required air temperature while the EC Fans manages the desired airflow. This ensures that only the necessary kilowatts of input power are used to cool the IT load. Units which include the Alco Electronic Expansion Valve are able to further increase overall system efficiency by reducing the condensing temperature during cooler seasons and at the same time preserving the Sensible Heat Ratio.

Enhanced Freecooling

Liebert® PDX offers a full range of Freecooling solution that answers to all the different needs of the different sites application.



Indirect Water based Freecooling – The right cooling with the minimum consumption

Whenever the Critical application needs a complete separation between indoor and outdoor or the Humidity control band requirements are tight Liebert® PDX offers the possibility to exploit water based indirect freecooling. Thanks to the double coil (Freecooling water and Direct Expansion) the unit provides the highest saving match with full availability of the DX solution.

The usage of Stage Coil and Digital Scroll then allows maximizing the saving in mixed mode operation, so whenever the freecooling is not able to fully take the load the compressors can work just to complete the missing cooling needs.

Therefore Liebert® PDX Freecooling can provide extremely high energy saving granting the highest availability of the application.

Liebert® Economizer – Direct Freecooling for Data Centers

When the site allows for Direct freecooling application, and the Humidity control (still required as for most of Data Centers applications) band requirements can be enlarged to the limits of the ASHRAE (*ASHRAE: 2011 Thermal Guidelines for Data Processing Environments*) recommended zone, the Liebert® PDX offers the right solution for Data Centers.

Liebert® Economizer allows checking not only if the external air has the right temperature to start giving some partial freecooling benefits, but also to check if the humidity is on the right conditions.

Liebert® PDX Top Efficiency

In fact humidity control requires a relevant part of energy, therefore having an intelligent control, which allows using the external air only when it makes sense from all energy aspects, it is a key element for a Direct Freecooling for Data Center.

Liebert® PDX with Economizer solution allows maximizing direct freecooling benefits coupling the needed control of temperature and humidity, providing the full back up availability of the direct expansion solution.

Premium Fan Module – Technology for efficiency

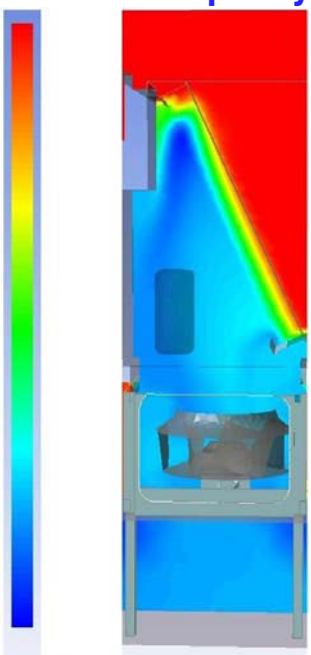
The Premium Fan Module are the evolution of the EC fans technology. They are made of composite material. This new technology allows keeping the current high–strength of aluminum alloy adding the benefits of light weight and full flexibility on blade design of the new material. Liebert® PDX has been designed around these new fans in order to have the highest benefits from the new technology, translating the new Premium Fan Module into reduced noise levels as well as increased energy efficiency.
The high–level supervision of multiple units allows them to work together as a single system to optimize room temperature and humidity. This is of particular importance when the EC Fan is considered. EC fan power consumption functions according to the square–cube law, so that having five units running at 80% instead of four at 100%, means the energy used from the fans of the entire group is reduced by 36%. iCOM manages the reduction of fan speed whenever operation at full capacity is not required.

Unit Aeraulic Design – A new way to look at aerodynamics

Aerodynamics is commonly associated with cars and motorbike racing or with flying aspects. With Liebert® PDX aerodynamics will be applied also high precision cooling design.

In fact, the internal design of Liebert® PDX has been deeply studied in order to optimize the aerodynamic impact of all the internal parts: coil shape, coil size, coil angle, electrical panel design, etc… This means a dramatically reduced internal air pressure drop that immediately becomes a benefit in terms of reduced unit power consumption.

Heat Exchanger Section: Stage Coil Net Sensible Capacity matters



CONTOURS OF
STATIC TEMPERATURE

Efficiency is a fundamental requirement in all applications today. Even more for technological applications where the operational costs are by far the most significant consideration. Sensible Heat Ratio (SHR) values of greater than 0.90 are required to reduce to a minimum the energy spent controlling humidity during normal operating conditions.
Heat exchanger design and a correct air distribution within the unit are two of the most important factors required to achieve optimum performance.
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Heat exchanger design and a correct air distribution within the unit are two of the most important factors required to achieve optimum performance.
Liebert® PDX units feature a very high coil heat exchanger surface respect to the exchanged power. Using the index [frontal Surface x Rows / refrigeration Power] values of over 100 mm^2/W are obtained.
In dual circuit units, the dual stage coil increases the evaporator temperature maximizing the SHR and increasing the unit efficiency.
At partial load, the efficiency is strongly increased, due to the use of the total amount of airflow and frontal coil surface: with non–staged coil system, only half heat exchanger frontal surface was interested by the thermal exchange.

Liebert® PDX Top Efficiency

Sophisticated design and development tools, such as Particle Image Velocimetry and Computational Fluid Dynamics are used by Emerson Network Power to identify the best components layout in order to achieve an even and pressure–equalized airflow distribution within the unit which optimizes the entire coil surface area in the heat exchanging process.Liebert® PDX units feature a very high coil heat exchanger surface respect to the exchanged power. Using the index [frontal Surface x Rows / refrigeration Power] values of over 100 mm^2/W are obtained.
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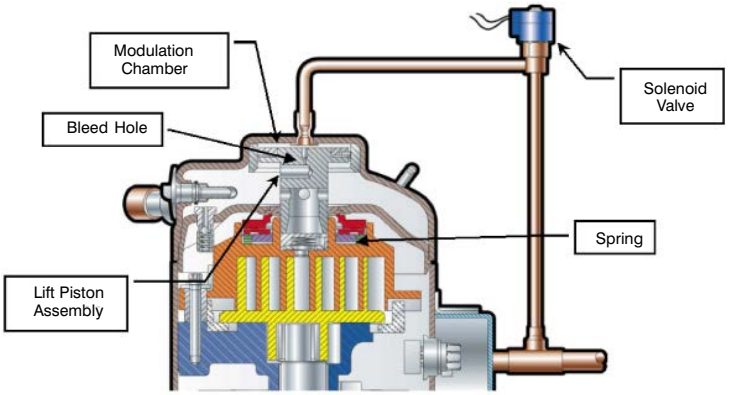
Digital Scroll Compressor

Digital Scroll provides the necessary level of cooling by adjusting its delivery according to the heat load, thus ensuring constant, precise temperature levels.
The Digital Scroll operates in two stages – the ”loaded state”, when the solenoid valve is normally closed and ”unloaded state”, when the solenoid valve is open. During the loaded state the compressor operates like a Standard scroll and delivers full capacity and mass flow. However, during the unloaded state, there is no capacity and no mass flow through the compressor.
This allows having a number of benefits in terms of Efficiency:

- Perfect match between Cooling Capacity and Heat Load.
- Lower power input at partial load.
- Possibility to size cooling system to overcome future heat load growth.
- Improved SHR once the compressor is modulating (due to better evaporating temperature)



Electronic Expansion Valve (EEV)

The valve is designed for modulating control of refrigerant circuits with highspeed and high precision. The EEV provides superior performance compared to a Thermostatic Expansion Valve (TXV), due to:

- Precise flow control
- Positioning time

EEV ensures a better control on super heating at the end of the evaporator, ensuring at the same time that compressor will never be filled by liquid from the 10% to 110% of its nominal capacity, instead a mechanical one cannot ensure it. It has to be calibrated and then it will work properly but only around the calibration point.
This means that a TXV works better (i.e. better control, longer life) with a condensing pressure as much as possible constant. For such reason with TXV the condensing temperature is kept around 45°C as set point. But during the coldest period the condensing temperature can be lowered and the electronic expansion valve adapts to this new situation. This permits an increase of the cooling capacity of the unit, a decrease of the unit power input and so increase the energy efficiency of the entire Liebert® PDX unit.
Liebert® PDX allows having an option the EEV both on Standard Scroll and on Digital Scroll. The choice is driven by the application:

- Only temperature control – or wide range or Humidity band T→In this case the EEV gives a great efficiency effects both with Standard and Digital Scroll technology. To get the biggest advantage, a different pressure set point can be used for the fan speed controller of the Liebert remote condenser.
- Close Humidity control → Often, even the TXV valve allows to get good results, mainly thanks to the Digital Scroll modulation.

Liebert® PDX serviceability

Attention to design detail means low operational costs including product maintenance through high levels of reliability and a service friendly design. As an example, all the crucial parts of the refrigeration circuit (i.e.: thermostatic valves, sight glasses and liquid line driers) are grouped together and accessible simply by opening the front door.

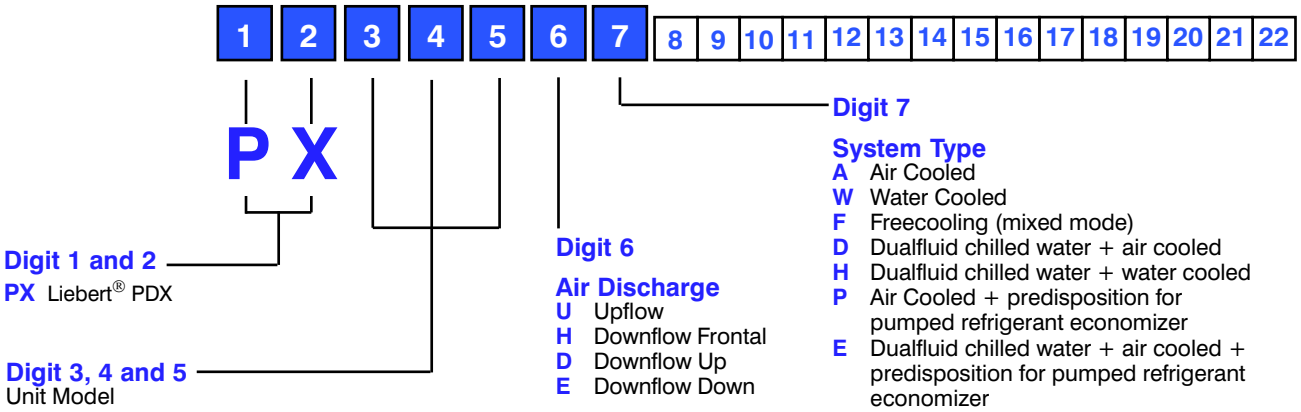
Easy maintenance

All components are easily accessible from the front of the room unit. The service compartment facilitates checking and setting of refrigeration circuit, without changing aeraulic conditions. The access to the compressor is possible even when the unit is operating by removing the front panel. The access to the fan is executed with the greatest care for easier interventions (maintenance and/or fan replacement).
One very important feature, for example, is the possibility to check the total pressure drop of the high pressure piping using the schrader connections available in the front part of the machine.

2 Model Configuration

Digit Nomenclature

The unit is fully defined by twenty two digits.



Digit 8 – Airflow

L Premium Fan Module
1 Basic Fan Module (Fix Speed)

Digit 9 – Main Power Supply

3 Single 400V / 3ph / 50 Hz + N
T Single 380V / 3ph / 60Hz + N
A Single 460V / 3ph / 60Hz

Digit 10 – Cooling System

6 Single Circuit Scroll R410A with TXV
7 Single Circuit Digital Scroll R410A with TXV
S Single Circuit Scroll R410A with EEV
U Single Circuit Digital Scroll R410A with EEV
4 Dual Circuit Scroll R410A with TXV
T Dual Circuit Digital Scroll R410A with TXV
W Dual Circuit Scroll R410A with EEV
X Dual Circuit Digital Scroll R410A with EEV

Digit 11 – Humidification

0 None
H Infrared Humidifier
U Ultra Sonic Humidifier
S Electrode Humidifier

Digit 12 – Microprocessor Control

2 Inner Display only T sensor
3 Inner Display TH sensor
U Small Cold fire display T sensor
B Small Cold fire display TH sensor
C Large Cold fire display T sensor
D Large Cold fire display TH sensor
W Small Cold fire display T sensor (for extended UP units)
X Small Cold fire display TH sensor (for extended UP units)
Y Large Cold fire display T sensor (for extended UP units)
Z Large Cold fire display TH sensor (for extended UP units)

Digit 13 – Heating & Re–Heating

0 None
1 Electric heating Std Capacity
2 Electric heating High Capacity
4 Hot Water Heating
6 Hot Gas Reheat
8 El. heating Std Capacity + Hot Water Heating
A El. heating Std Capacity + Hot Gas Reheat

Digit 14 – Air Filter Efficiency

1 F5 (EU5) dust spot
3 F5 (EU5) dust spot + Clogged Filter

Digit 15 – Condensing Control

1 Air Cooled or Water Cooled with Standard Pressure, 2 way MBV
7 Water Cooled with Standard Pressure, 3 way MBV

Digit 16 – Colour

1 Black Emerson RAL 7021

Digit 17 – High Voltage Option

D Standard Power Supply
F Dual Power Supply Parallel + Magnetic circuit breaker for 10 A single phase 50Hz
2 Magnetic circuit breaker for 10 A single phase 50Hz
Q Magnetic circuit breaker for 10 A three phases 50Hz
5 Condensate Pump
7 Magnetic circuit breaker for 10 A single phase, 50Hz, with Condensate Pump
R Magnetic circuit breaker for 10 A three phases, 50Hz, with Condensate Pump
G Dual Power Supply Alternate with ATS + Magnetic circuit breaker for 10 A single phase
S Dual Power Supply Alternate with ATS and UPS for iCOM + Magnetic circuit breaker for 10 A single phase breaker for 10A single phase
T Dual Power Supply parallel + Magnetic circuit breaker for 10A three phases
U Dual Power Supply Alternate with ATS + Magnetic circuit breaker for 10A three phases
V Dual Power Supply Alternate with ATS and UPS for iCOM + Magnetic circuit breaker for 10 A three phases

Digit 18 – Package Option

0 None
S Predisposition for Smart Aisle (Predisposition for damper, Sensors, 3 position switch)
F Predisposition for Economizer (sensors, predisposition for dampers)
G Predisposition for Smart Aisle + Economizer
H Predisposition for damper
L Predisposition for plenum installation

Model Configuration

Digit 19—Monitoring
N No IS Housing
0 No Card
1 IS Web only
2 Two IS Web
3 IS485 only
4 Two IS485
5 IS Web & IS 485
C SiteLink — E card
D SiteLink — E plus IS Web card
E SiteLink — E plus IS485 card
F IS—IPBML card
G 2 x IS—IPBML card
H IS—IPBML plus 1 x IS Web card
J IS—IPBML plus 1 x IS485 card
K IS—IPBML plus SiteLink - E card

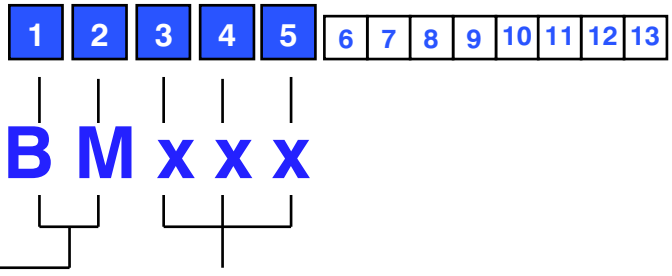
Digit 20— Sensors
0 None

Digit 21 —Packaging
P PLP and Pallet
C PLP and Wooden Crate
S Seaworthy

Digit 23 —Special Requirements
A Standard Emerson Network Power
X Special Emerson Network Power

Digit Nomenclature (Fan Module)

Only for Extended Height Unit
The base unit is fully defined by thirteen digits



Digit 1 and 2 — Fan Module

BM Fan Base Module
BF Fan Base Frame
TP Fan Top Plenum

Digit 3, 4 and 5 — Size: Nominal Length

176 — 1750 mm
121 — 1200 mm

Digit 6 — Air delivery (only for BM)
S Standard
B Back (fans removal from the front)
F Front

Digit 7 — Fans
L Premium Fan Module
1 Basic Fan Module (Fix Speed)

Digit 8 — Heaters
0 No heaters
1 Std Capacity
2 High Capacity

Digit 9 — Packaging
P PLP and Pallet
C PLP and Wooden Crate
S Seaworthy

Digit 10 —Free

Digit 11 —Free

Digit 12 —Free

Digit 13 —Special Requirements
A Standard Emerson Network Power
X Special Emerson Network Power

Model Configuration

Air discharge version (digit 6)

U– Upflow

H– Downflow frontal (Standard unit only)

D– Downflow Up

E– Downflow Down

Option for Extended Height unit Downflow Up

Front Air Delivery (Option **F** in Digit 6 Fan Module)

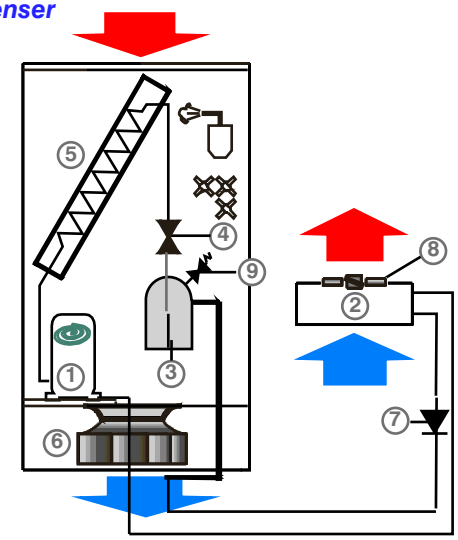
Back Air Delivery* (Option **B** in Digit 6 Fan Module)

* The unit has to be installed with the air delivery ducted or with the air flow channelled below the raised floor.

Cooling Versions (Digit 7)

Version A

Direct expansion units with air–cooled condenser



Air cooled direct expansion units optimize condensing temperature in the simplest installation configurations and with minimized site impact.
The compressor (1) pumps the hot gaseous refrigerant into an outdoor air–cooled condenser (2). The liquefied refrigerant arrives to a liquid receiver (3) that ensures a constant and even refrigerant flow to the expansion valve (4) and then arrives to the evaporator (5). Here the refrigerant, thanks to the heat – exchanged with the room air moved by the fan (6) – evaporates and returns to the compressor (1); from this point, the refrigerant begins a new refrigeration cycle. To maintain the correct refrigerant discharge pressure, the speed of the motor fan (8) is controlled (proportional mode). Shut–off valves are provided as standard to assist with routine maintenance. The compressor (1) has a built–in non–return valve to avoid return of liquid refrigerant from the condenser in summertime, thus protecting the compressor from undesired refrigerant slugging during the start up. A second non–return valve (7) is necessary to avoid – in wintertime – refrigerant migration from the liquid pipes and the receiver (3) to the condenser (2), that should be responsible of low pressure intervention at the start–up of compressor.
For safety reason, a relief valve (9) is installed on the liquid receiver (3); this valve is equipped with flanged connections so that the refrigerant may be discharged to the outside.

External air–cooled condenser (2)

The units may be connected with a wide range of our condensers in standard or low noise version. For technical data and performance, refer to the relevant technical documentation. Chap. 5 gives the recommended matching condenser for Liebert® PDX units as a function of outdoor air temperature. To ensure correct operation, best performance, and longest life the units must be connected to remote condensers approved by Emerson Network Power.

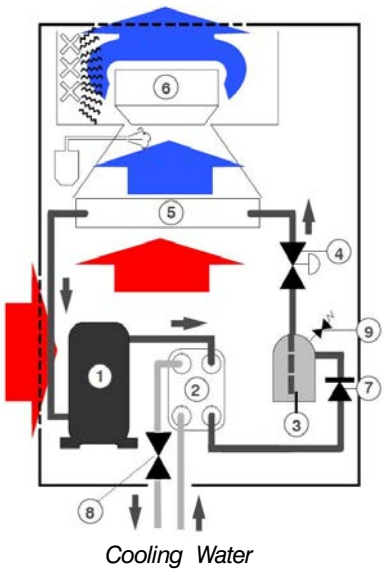
Note 1: *Units and external condensers are supplied separately.*

Note 2: *The room unit refrigeration circuit is pressurized with helium at 3 bar and the condenser refrigeration circuit at 2 bar with dry air.*

Note 3: *The customer is responsible for making connections between the Unit and the external condenser and for charging with refrigerant (standard R410A) and oil, when request.*
Full instructions for these operations are given in the User Manual.

Version W

Direct expansion units with water –cooled condenser



Liebert® PDX Water Cooled is the ideal configuration for leveraging all its efficiency benefits on applications with significant distances between internal and external units, or those with strong variations in geodetic height.
The compressor (1) pumps the hot gaseous refrigerant into a water–cooled condenser (2). The liquefied refrigerant arrives to a liquid receiver (3) that ensures a constant and even refrigerant flow to the expansion valve (4) and then arrives to the evaporator (5). Here the refrigerant, thanks to the heat – exchanged with the room air moved by the fan (6) – evaporates and returns to the compressor (1); from this point, the refrigerant begins a new refrigeration cycle.
The compressor (1) has a built–in non–return valve to avoid return of liquid refrigerant from the condenser, thus protecting the compressor from undesirable refrigerant slugging during the start up. A second non–return valve (7) is installed to avoid refrigerant migration from the liquid pipes and the receiver (3) to the condenser (2), that should be responsible of high

pressure intervention at the start—up of compressor.
For safety reason, a relief valve (9) is installed on the liquid receiver (3); this valve is equipped with flanged connections so that the refrigerant may be discharged to the outside.

Water—cooled condenser

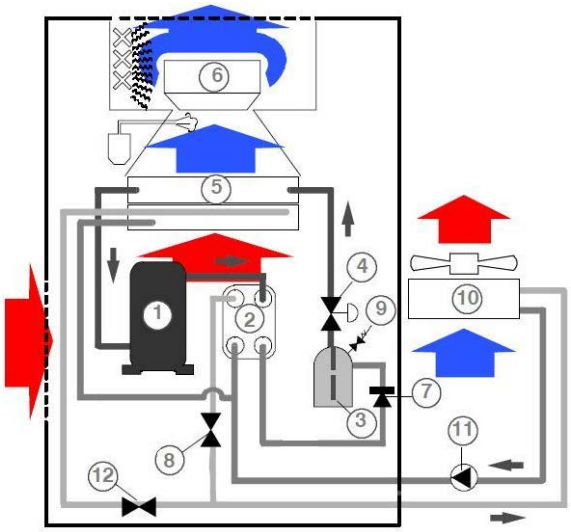
These units are provided with one very efficient stainless steel brazed—plate water—cooled condenser (2). The condenser is fitted with a modulating valve (8) for the automatic control of condensing pressure. The units operate with **mains water** or **closed circuit with an external Dry Cooler**. When operating in a closed circuit, to avoid undesired ice formation in wintertime, it is advisable to use water/glycol mixture: refer to Chap. 5 for the percentages to be used at minimum ambient temperatures. Dry Coolers are available as an option; water—glycol mixture and circulation pump(s) are normally supplied by others.
If mains water is used, a mechanical filter must be fitted in the water circuit to protect the plate condenser (2) (for other information see the User Manual).

Note. *The water—cooled Liebert® PDX versions are filled with the complete charge of the requested refrigerant (standard R410A).*

Version F

Freecooler units

As seen in the previous chapter for all applications where efficiency is a prime objective, the Liebert® PDX offers the possibility of leveraging the Freecooling effect for the longest period of time, as a result of its enhanced coil distribution. The flexibility of the Liebert® PDX Freecooling configuration ensures the highest energy savings and efficiency in variable working conditions including DX mode.



Cooling Water

Freecooling mode

The Freecooler unit cools the air flow by means of the air refrigerant coil (5) in direct expansion rows [direct expansion mode] or, as an alternative, the air/water coil (5) in freecooling rows [freecooling mode]. Whenever the outdoor temperature is at least 5 degrees below the indoor return temperature, the water flow is cooled by an external Dry Cooler (10) and passes through the coil (5). When the external temperature is higher than ZET (Zero Energy Temperature), the water exchanges heat with the refrigerant in the water—cooled plate condenser (2). When the external temperature is below ZET, the water is cooled as much as to cool the room air directly in the air/water coil (5, freecooling rows).

Refrigeration circuit

The compressor pumps the hot gaseous refrigerant into a water—cooled condenser (2). The liquefied refrigerant arrives to a liquid receiver (3) that ensures a constant and even refrigerant flow to the expansion valve (4) and then arrives to the direct expansion rows of the evaporator (5). Here the refrigerant, thanks to the heat — exchanged with the room air moved by the fan (6) — evaporates and returns to the compressor (1); from this point, the refrigerant begins a new refrigeration cycle.
The compressor (1) has a built—in non—return valve to avoid return of liquid refrigerant from the condenser, thus protecting the compressor from undesired refrigerant slugging during the start up. A second non—return valve (7) is installed to avoid refrigerant migration from the liquid pipes and the receiver (3) to the condenser (2), that should be responsible of high pressure intervention at the start—up of compressor.
For safety reason, a relief valve (9) is installed on the liquid receiver (3); this valve is equipped with flanged connections so that the refrigerant may be discharged to the outside.

Note. *The Liebert® PDX Freecoolers are filled with the complete charge of the requested refrigerant (standard R410A).*

Water—cooled condenser

These units are provided with one very efficient stainless steel brazed—plate water—cooled condenser (2). The condenser is fitted with a modulating valve (8) for the automatic control of condensing pressure.
To reduce water and energy consumption (pump), it's advisable to adopt a cooling water control valve (by the user), able to stop water feeding when unit is off.

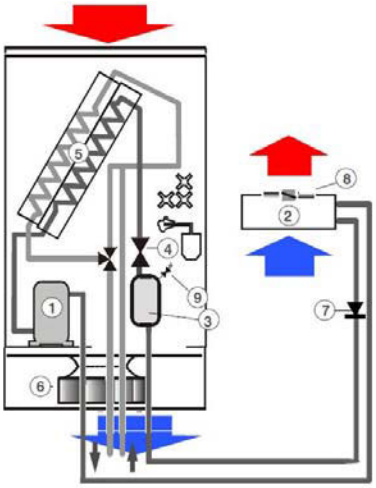
Water/glycol circuit

The units operate with **water in closed circuit with an external Dry Cooler** (10), cooled by the outside ambient air. To avoid undesired ice formation in wintertime, it is advisable to use water/glycol mixture: refer to the User Manual for the percentages to be used at minimum ambient temperatures.
The circulation of the water—glycol mixture is forced (the pump (11) and the water—glycol mixture are not supplied).
The unit is provided with 2—way modulating valve (12) to control the glycoled—water flow passing through the water/glycol coil.
The opening or closing signals, generated by the electronic controller, manage the valve actuator movement in order to maintain the desiderd conditions in the conditioned room.

Version D

Air —cooled condenser dualfluid units

Dual Fluid can be translated as cooling redundancy. In fact the unit provides the Direct Expansion full back up cooling to a Chilled Water common working circuit.
Ideal for chilled water based applications with transition between Air Conditioning and Precision Cooling, the Liebert® PDX Dual Fluid Air Cooled configuration, offers efficient direct expansion cooling that works as redundant cooling for chilled water coils.
The Dualfluid unit cools the air flow by means of the air refrigerant coil (5) in direct expansion rows [direct expansion mode: see refrigeration circuit] or, as an alternative, the air/water coil (5) in the chilled water rows [chilled water mode].



Cooling Water

Refrigeration circuit

The compressor (1) pumps the hot gaseous refrigerant into an outdoor air—cooled condenser (2). The liquefied refrigerant arrives to a liquid receiver (3) that ensures a constant and even refrigerant flow to the expansion valve (4) and then arrives to the evaporator (5). Here the refrigerant, thanks to the heat — exchanged with the room air moved by the fan (6) — evaporates and returns to the compressor (1); from this point, the refrigerant begins a new refrigeration cycle. To maintain the correct refrigerant discharge pressure, the speed of the motor fan (8) is controlled (proportional mode).
Shut—off valves are provided as standard to assist with routine maintenance.
The compressor (1) has a built—in non—return valve to avoid return of liquid refrigerant from the condenser in summertime, thus protecting the compressor from undesired refrigerant slugging during the start up. A second non—return valve (7) is necessary to avoid — in wintertime — refrigerant migration from the liquid pipes and the receiver (3) to the condenser (2), that should be responsible of low pressure intervention at the start—up of compressor.
For safety reason, a relief valve (9) is installed on the liquid receiver (3); this valve is equipped with flanged connections so that the refrigerant may be discharged to the outside.

External air—cooled condenser

The units may be connected with a wide range of our condensers in standard or low noise version. For technical data and performance, refer to the relevant technical documentation. Chap. 5 gives the recommended matching condenser for Liebert® PDX units as a function of outdoor air temperature. To ensure correct operation, best performance, and longest life the units must be connected to remote condensers approved by Emerson Network Power .

Note 1. *Units and external condensers are supplied separately.*

Note 2. *The room unit refrigeration circuit is pressurised with helium at 3 bar and the condenser refrigeration circuit at 2 bar with dry air.*

Note 3. *The customer is responsible for making connections between the Unit and the external condenser and for charging with refrigerant (standard R410A).*

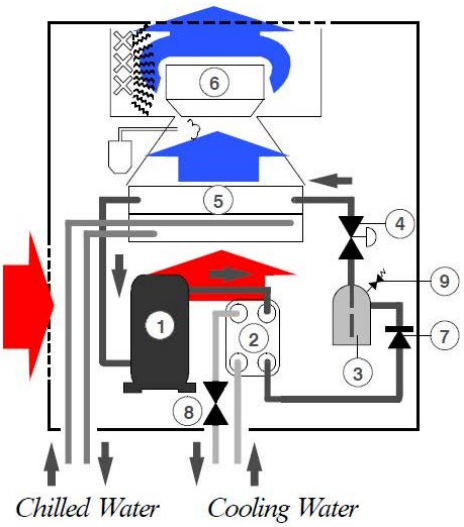
Full instructions for these operations are given in the User Manual.

Model Configuration

Version H

Water–cooled condenser dualfluid units

Dual Fluid can be translated as cooling redundancy. In fact the unit provides the Direct Expansion full back up cooling to a Chilled Water common working circuit.
This cooling configuration perfectly adapts to any installation layout, therefore chillers and dry coolers can be placed wherever necessary on the site.



Dualfluid mode

The Dualfluid unit cools the air flow by means of the air–refrigerant coil (5) in direct expansion rows [direct expansion mode: see refrigeration circuit] or, as an alternative, the air/water coil (5) in the chilled water rows [chilled water mode].

Refrigeration circuit

The compressor (1) pumps the hot gaseous refrigerant into a water–cooled condenser (2). The liquefied refrigerant arrives to a liquid receiver (3) that ensures a constant and even refrigerant flow to the expansion valve (4) and then arrives to the evaporator (5). Here the refrigerant, thanks to the heat – exchanged with the room air moved by the fan (6) – evaporates and returns to the compressor (1); from this point, the refrigerant begins a new refrigeration cycle.
The compressor (1) has a built–in non–return valve to avoid return of liquid refrigerant from the condenser, thus protecting the compressor from undesirable refrigerant slugging during the start up.
The second non–return valve (7) avoids refrigerant migration from the liquid pipes and the receiver (3) to the condenser (2), that should be responsible of high pressure intervention at the start–up of compressor.
For safety reason, a relief valve (9) is installed on the liquid receiver (3); this valve is equipped with flanged connections so that the refrigerant may be discharged to the outside.

Water–cooled condenser

These units are provided with one very efficient stainless steel brazed–plate water–cooled condenser (2). The condenser is fitted with a modulating valve (8) for the automatic control of condensing pressure.
The units operate with **mains water or open cooling tower water**.
If mains water or open tower water are used, a mechanical filter must be fitted in the water circuit to protect the condenser (for other information see the User Manual).

Note 1. *The water–cooled Dualfluid versions are filled with the complete charge of the requested refrigerant (standard R410A).*
Note 2. *To complete the Dualfluid system it is necessary to connect the chilled water coming from the external source to the air/water coil connections (5).*

Airflow (digit 8)

L –Premium Fan Module

The improvements of the EC Fan are connected with the benefits from a continuous speed control by iCOM. In fact with premium solution we can have a modulating fan speed based upon the load required, saving the power input of the fans.
EC fan power consumption functions according to the square–cube law, so that having ten the fan running at 70% instead of seven at 100%, means the energy used from the fans of the unit is reduced by more than 50%.
So as at any time the unit will run in partial load Liebert® PDX with premium fan module can allow to increase the saving of the stage coil thanks to saving on the fans side.

1 – Basic Fan Module (EC Fan Fix Speed)

The latest technology available: Plastic EC Fans.
They are made of composite material. This new technology allows keeping the current high–strength of aluminum alloy adding the benefits of light weight and full flexibility on blade design of the new material.
With a simple control logic that allows setting the unit for the specific site need and then have the unit running in that way. The EC Fan Fix speed can be set very easily at fixed fan speed, directly acting on the iCOM control without any need of cabling autotransformers voltages.

3 Operating Range

Liebert® PDX units are provided for operating within the following working ranges (the limits concern new units on which correct installation have already been made):

All versions

Room air conditions	Temperature:	from 20°C to 35°C
	Humidity ratio	From 5.5 g/kg to 12 g/kg
	Relative humidity	From 20% to 60%
Room air conditions (units for Smart Aisle application)	Temperature:	from 26°C to 38°C
	Humidity ratio	From 5.5 g/kg to 12 g/kg
	Relative humidity	From 20% to 60%
Hot water circuit	inlet water temperature	max. 85°C
	water pressure	max. 8.5 bar
Storage conditions	from:	– 20°C
	to:	50°C
Power supply tolerances		V ± 10%, Hz ± 2

For A and D units

Outdoor temperature: lower limit	
Exceeding the winter low temperature limits could stop the compressor(s) by Low Pressure transducer. Reset to normal operation can only be carried out manually through the unit control.	
down to –20°C	between –20°C and –30°C
Remote condenser fan speed control (VARIEX) required	Remote condenser fan speed control (VARIEX) + Head pressure control valve (LOWTEX) + increased liquid receiver required. Hot Gas Reheat not allowed
Outdoor temperature: higher limit	
This limit is determined by coupled condenser model. Exceeding of this limit (or a lack of maintenance), will caused a compressor stop by HP safety thermostat. Reset to normal operation can only be carried out manually.	
Approved Remote Air Condenser	
To ensure correct operation, best performance, and longest life the units must be connected to remote condensers approved by Emerson Network Power. The warranty clauses are no longer valid if the unit is connected to an unapproved remote condenser.	

Relative position room unit vs. remote condenser			
From unit to condenser max distance	up to 60 m equivalent length	up to 100 m equivalent length	up to 60 m equivalent length
From unit to condenser max geodetic height (1) (2)	from 20 m to –3 m	from 30 m to –8 m	from –8 m to –15 m
Requirements			
Pipe diameter	see Tab 12c	see Tab 12c	see Tab 12c
Oil traps on vertical line of gas refrigerant	every 6 m, max	every 6 m, max	every 6 m, max
Extra oil charge	see User Manual	see User Manual	see User Manual
Remote condenser fan speed control (VARIEX) installation	mandatory	mandatory	mandatory
Condenser	design	oversized +20%	oversized +30%
Hot gas reheat	allowed	NOT allowed	NOT allowed
Additional non return valve on delivery line, at 2 m from compressor	recommended	mandatory	mandatory

Operating Range

For W, F and H units

Water or mixture temperature to condenser, lower limit (other information User Manual)	min. 5°C

For F, D and H units

Water condenser circuit and chilled water circuit	
inlet water temperature	min. 5°C
water pressure	max. 16 bar

Max. differential pressures on the modulating valve (2 or 3 ways)

– Max. differential pressure through the closed valve: Δp_{cv}

– Max. differential pressure across the valve for modulating service: Δp_{ms}

Models	Δp_{cv} (kPa)	Δp_{ms} (kPa)
PX....W/H (water condenser circuit)	175	175
PX....F	175	175
PX041 D/H (chilled water circuit)	300	300
PX047 D/H "	300	200
PX051 D/H "	300	200
PX044 D/H "	300	200
PX054 D/H "	300	200
PX062 D/H "	300	200
PX068 D/H "	210	200
PX082 D/H "	210	200
PX094 D/H "	210	200
PX104 D/H "	210	200

(1) Positive difference in height: condenser above conditioner
(2) Negative difference in height: condenser below conditioner
Other information in User Manual.

4 Technical Data

Liebert® PDX performances are linked to room conditions, cooling system, airflow.
The unit fitted with Digital Scroll Cooling System and Premium Fan Module can also modulate cooling capacity and airflow depending on the cooling needs. Therefore each single model can provide a wide range of capacity depending on the environment it is applied in.
Below is a description of the most common conditions currently used in Data Center applications. This can help giving a picture on unit performances. Liebert® PDX is an extremely flexible unit able to adapt to different sites needs. Emerson Network Power sales force has a selection tool able to provide the unit performances at the different conditions required.

LEGACY

This kind of system works with room air condition 24°C, R.H. 50%.
This system is often applied when the same direct expansion/chilled water system is used both for cooling the data centers as well as for air conditioning for people. In fact low air temperature allows a higher dehumidification required for air conditioning. In data centers dehumidification is not an advantage.
The only heat load provided by the server is sensible heat load. Therefore Liebert® PDX is optimized to provide the highest net sensible capacity even at low air temperatures.
You can find a reference of Liebert® PDX performances published in Liebert® PDX Brochure. Anyhow being currently this kind of working range mostly used in existing applications, and therefore, being required in different unit modulations to compare with the existing solutions, we suggest to contact our Sales representative that can offer you a detailed performance data sheet matching exactly your needs.

SMART

This kind of system works with room air condition 35°C, R.H. 30%, convenient for cold aisle containment. Emerson Network Power can offer a full solution: Smart Aisle™.
Smart Aisle™ means a solution that goes from the rack to the power distribution, from the cooling to the AC power. It is a system optimized to offer the highest energy efficiency.
Here is a description of the cooling part of this system.
Due to the closure of the cold aisle the back air of the CRAC units can be relatively high.
This maximizes the Freecooling period and makes this system suitable for all different climates; it offers the benefit to use the Freecooling even in hot countries.
Liebert® PDX optimizes its cooling capacity and its airflow following the server requirements.
On the following pages you can find tables with references for the unit performances with these working conditions.
Due to the Smart Aisle Application system Optimization, the units can work with the precise airflow required by the servers, not being present in the data center airflow recirculation or bypass.
Should you need more information on how the unit can run with different airflow, working temperatures, etc. our sales force can provide a full detailed data sheet that can match your requirements.

Technical Data

Tab. 4a — Scroll Cooling System direct expansion unit @ 100% cooling capacity, Premium Fan Module

PXxxx A/W series

MODELS				PX041	PX045	PX047	PX051	PX057
Power supply voltage			V/Ph/Hz	400V ±10% / 3Ph / 50Hz				
Refrigerant circuit				single	single	single	single	single
PERFORMANCE LEGACY (1)(2)				**Air Condition: 24°C, R.H. 50%**				
air flow			m^3/h	10000	10900	14500	15800	16300
Refrigerant						R410A		
total gross cooling capacity			kW	40.4	44.6	46.3	53.1	58.9
sensible gross cooling capacity			kW	37.7	41.5	46.3	53.1	57.9
SHR (sensible/total ratio)			–	0.93	0.93	1	1	0.98
compressor power input			kW	8.26	9.31	9.34	11.27	12.65
compressor OA			A	15.13	17.43	17.47	22.27	24.33
Configuration	**Upflow**	Net Sensible cooling capacity	kW	36.2	39.8	43.7	49.9	55.1
		fan power input	kW	1.47	2.39	2x1.28	2x1.6	2x1.71
		unit power input	kW	9.76	11.74	11.93	14.5	16.1
	Downflow Up	Net Sensible cooling capacity	kW	35.8	39.1	43.8	50	54.6
		fan power input	kW	1.9	2.39	2x1.23	2x1.55	2x1.66
		unit power input	kW	10.19	11.73	11.83	14.4	16
	Downflow Down	Net Sensible cooling capacity	kW	36	39.3	44.2	50.5	55.1
		fan power input	kW	1.72	2.13	2x1.05	2x1.29	2x1.39
		unit power input	kW	10.01	11.47	11.47	13.88	15.46
	Downflow Frontal	Net Sensible cooling capacity	kW	35.3	39.1	43.4	49.5	53.4
		fan power input	kW	1.41	2.33	2x1.19	2x1.49	2x1.61
		unit power input	kW	9.7	11.67	11.74	14.28	15.9
Condensing section (W models only)								
water inlet temp: 30°C—condensation temp: 45°C								
water flow			l/s	0.918	1026	1061	1245	1363
water side pressure drop			kPa	11	14	15	20	18
FAN								
Quantity (Premium Fan Module)			no.	1	1	1	1	1
FLA			A	5	5	5	5	5
LRA			A	0.1	0.1	0.1	0.1	0.1
Quantity (Basic Fan Module, Fix speed)			no.	1	1	1	1	1
FLA			A	5	5	5	5	5
LRA			A	0.1	0.1	0.1	0.1	0.1
COMPRESSOR								
Quantity (Scroll Cooling System)			no.	1	1	1	1	2
FLA			A	25	31	31	34	2x21
LRA			A	118	140	140	174	2x111
EVAPORATING COIL								
quantity / configuration			no.	1	1	1	1	1
pipes/fins						Copper/treated aluminum		
pitch fins			mm	1.8	1.8	1.8	1.8	1.8
rows			no.	6	6	4	4	4
front surface			m^2	1.1375	1.1375	1.825	1.825	1.825
REFRIGERANT CONNECTIONS (A models only)				**Refrigerant connecting pipe diameter: see Tab. 12f, Chap. 12**				
gas line outlet (pipe to be welded, o.d.)			mm	22	22	22	22	22
liquid line inlet (pipe to be welded, o.d.)			mm	18	18	18	18	18
WATER CIRCUIT (W models only)								
condenser type (W models only)						Brazed plate		
water connections ISO 7/1 (W models only)			inch	Rp 1 1/4	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼
Total water internal volume			l	4.54	4.54	4.54	4.54	5.54
DIMENSIONS								
width			mm	1200	1200	1750	1750	1750
depth			mm	890	890	890	890	890
height			mm	1970	1970	1970	1970	1970
footprint			m^2	1.068	1.068	1.5575	1.5575	1.5575

Data refers to Standard Units without options, Premium Fan Module with clean F5 filters.
Standard ESP: Upflow 50Pa; Downflow Up 20Pa; Downflow Down 20 Pa Downflow Frontal 0Pa
For Downflow Up and Down versions the data refers to the height of the raised floor = 600mm
Performance data refers to Downflow Units, if not specified otherwise.

(1) IN THE FOLLOWING STANDARD CONDITIONS: Room conditions 24°C bs; 50% R.H. (17°C wb) — Condensing temperature: 45°C — Air flow of the units refers to the standard configuration with F5 class filter.

(2) Liebert PDX is able to adapt to the different site needs and working conditions. Performances in different working conditions, different airflows can be provided by Emerson Network Power representatives.

Technical data can be subject to change without notice.

Technical Data

MODELS				PX044	PX054	PX062	PX074	PX068	PX082
Power supply voltage			V/Ph/Hz	400V ±10% / 3Ph / 50Hz					
Refrigerant circuit				double	double	double	double	double	double
PERFORMANCE LEGACY (1)(2)				**Air Condition: 24°C, R.H. 50%**					
air flow			m^3/h	12500	15500	16300	17600	18500	24000
Refrigerant				R410A					
total gross cooling capacity			kW	44.8	55.2	62.5	74.8	66.2	85.7
sensible gross cooling capacity			kW	44.3	54.6	59.5	67.7	64.8	83.6
SHR (sensible/total ratio)			–	0.99	0.99	0.95	0.9	0.98	0.98
compressor power input			kW	4.56+4.55	5.51+5.53	6.33+6.33	8.27+7.27	6.33+6.33	8.29+8.26
compressor OA			A	8.16+8.14	10.77+10.82	12.17+12.17	15.14+13.98	12.17+12.17	15.17+15.13
Configuration	**Upflow**	Net Sensible cooling capacity	kW	41.9	50.7	55.1	62.6	62.7	79.5
		fan power input	kW	2x1.07	2x1.75	2x1.99	2x2.44	3x0.95	3x1.76
		unit power input	kW	11.28	14.57	16.66	20.45	15.54	21.87
	Downflow Up	Net Sensible cooling capacity	kW	42.3	51.2	55.6	62.9	62.2	78.5
		fan power input	kW	2x0.99	2x1.70	2x1.94	2x2.38	3x0.88	3x1.71
		unit power input	kW	11.12	14.47	16.57	20.33	15.33	21.71
	Downflow Down	Net Sensible cooling capacity	kW	42.6	51.6	56.2	63.6	62.4	79
		fan power input	kW	2x0.84	2x1.49	2x1.66	2x2.02	3x0.8	3x1.55
		unit power input	kW	10.82	14.05	16.01	19.61	15.09	21.23
	Downflow Frontal	Net Sensible cooling capacity	kW	41.6	50.2	54.6	62	–	–
		fan power input	kW	2x0.92	2x1.65	2x1.88	2x2.32	–	–
		unit power input	kW	10.98	14.38	16.44	20.21	–	–
Condensing section (W models only) **water inlet temp: 30°C—condensation temp: 45°C**									
water flow			l/s	0.554+0.487	0.678+0.598	0.766+0.678	0.940+0.755	0.779+0.684	1.031+0.907
water side pressure drop			kPa	13+10	13+11	13+10	11+8	8+6	14+11
FAN									
Quantity (Premium Fan Module)			no.	2	2	2	2	3	3
FLA			A	10	10	10	10	15	15
LRA			A	0.2	0.2	0.2	0.2	0.3	0.3
Quantity (Basic Fan Module, Fix speed)			no.	1	1	2	2	2	2
FLA			A	5	5	10	10	10	10
LRA			A	0.1	0.1	0.2	0.2	0.2	0.2
COMPRESSOR									
Quantity (Scroll Cooling System)			no.	2	2	2	2	2	2
FLA			A	2x15	2x16.2	2x21	2x25	2x21	2x25
LRA			A	2x75	2x101	2x111	2x118	2x111	2x118
EVAPORATING COIL									
quantity / configuration			no.	1	1	1	1	1	1
pipes/fins				Copper/treated aluminum					
pitch fins			mm	1.8	1.8	1.8	1.8	1.8	1.8
rows			no.	3+3	3+3	3+3	3+3	3+3	3+3
front surface			m^2	1.675	1.675	1.675	1.675	2.675	2.675
REFRIGERANT CONNECTIONS (A models only)				**Refrigerant connecting pipe diameter: see Tab. 12f, Chap. 12**					
gas line outlet (pipe to be welded, o.d.)			mm	18/18	18/18	18/18	22/22	18/18	22/22
liquid line inlet (pipe to be welded, o.d.)			mm	18/18	18/18	18/18	18/18	18/18	18/18
WATER CIRCUIT (W models only)									
condenser type (W models only)				Brazed plate					
water connections ISO 7/1 (W models only)			inch	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼
Total water internal volume			l	5.42	6.1	6.76	8.98	8.98	8.98
DIMENSIONS									
width			mm	1750	1750	1750	1750	2550	2550
depth			mm	890	890	890	890	890	890
height			mm	1970	1970	1970	1970	1970	1970
footprint			m^2	1.5575	1.5575	1.5575	1.5575	2.2695	2.2695

Data refers to Standard Units without options, Premium Fan Module with clean F5 filters.
Standard ESP: Upflow 50Pa; Downflow Up 20Pa; Downflow Down 20 Pa Downflow Frontal 0Pa
For Downflow Up and Down versions the data refers to the height of the raised floor = 600mm
Performance data refers to Downflow Units, if not specified otherwise.

(1) IN THE FOLLOWING STANDARD CONDITIONS: Room conditions 24°C bs; 50% R.H. (17°C wb) – Condensing temperature: 45°C – Air flow of the units refers to the standard configuration with F5 class filter.

(2) Liebert PDX is able to adapt to the different site needs and working conditions. Performances in different working conditions, different airflows can be provided by Emerson Network Power representatives.

Technical data can be subject to change without notice.

Technical Data

MODELS				PX094	PX104	PX120	PX059 EXT	PX092 EXT
Power supply voltage			V/Ph/Hz	400V ±10% / 3Ph / 50Hz				
Refrigerant circuit				double	double	double	double	double
PERFORMANCE LEGACY (1)(2)				**Air Condition: 24°C, R.H. 50%**				
air flow			m^3/h	26000	27000	27000	11200	17950
Refrigerant						R410A		
total gross cooling capacity			kW	94.4	106.5	123.8	54.4	92.5
sensible gross cooling capacity			kW	91.3	98.8	107.7	45.1	76.3
SHR (sensible/total ratio)			–	0.97	0.93	0.87	0.93	0.83
compressor power input			kW	9.42+9.31	11.29+11.24	14.55+12.65	12.65	11.26+9.27
compressor OA			A	17.57+17.42	22.3+22.22	27.96+24.33	24.33	22.25+17.36
Configuration	**Upflow**	Net Sensible cooling capacity	kW	86	92.9	101.9	45.3	72.8
		fan power input	kW	3x2.13	3x2.39	3x2.39	1.98	2x1.85
		unit power input	kW	25.17	29.73	34.4	14.66	24.24
	Downflow Up	Net Sensible cooling capacity	kW	84.9	91.8	100.7	43	72.3
		fan power input	kW	3x2.13	3x2.33	3x2.33	2.12	2x2.02
		unit power input	kW	25.15	29.55	34.22	14.8	24.6
	Downflow Down	Net Sensible cooling capacity	kW	85.6	92.5	101.5	43.3	72.4
		fan power input	kW	3x1.9	3x2.08	3x2.08	1.85	2x1.96
		unit power input	kW	24.46	28.8	33.47	14.53	24.48
	Downflow Frontal	Net Sensible cooling capacity	kW	–	–	–	–	–
		fan power input	kW	–	–	–	–	–
		unit power input	kW	–	–	–	–	–
Condensing section (W models only)								
water inlet temp: 30°C—condensation temp: 45°C								
water flow			l/s	1.152+1.012	1.326+1.173	1.629+1.271	1329	1223
water side pressure drop			kPa	18+13	23+18	25+16	18	20
FAN								
Quantity (Premium Fan Module)			no.	3	3	3	1	2
FLA			A	15	15	15	5	10
LRA			A	0.3	0.3	0.3	0.1	0.2
Quantity (Basic Fan Module, Fix speed)			no.	2	2	–	1	2
FLA			A	10	10	–	5	10
LRA			A	0.2	0.2	–	0.1	0.2
COMPRESSOR								
Quantity (Scroll Cooling System)			no.	2	2	4	2	2
FLA			A	2x31	2x34	4x22	2x21	31 + 34
LRA			A	2x140	2x174	4x118	2x111	140 + 174
EVAPORATING COIL								
quantity / configuration			no.	1	1	1	1	1
pipes/fins						Copper/treated aluminum		
pitch fins			mm	1.8	1.8	1.8	1.8	1.8
rows			no.	3+3	3+3	3+3	6	3+3
front surface			m^2	2.675	2.675	2.675	1.53	2.412
REFRIGERANT CONNECTIONS (A models only)				**Refrigerant connecting pipe diameter: see Tab. 12f, Chap. 12**				
gas line outlet (pipe to be welded, o.d.)			mm	22/22	22/22	22/22	22/22	22/28
liquid line inlet (pipe to be welded, o.d.)			mm	18/18	18/18	18	18/18	18/18
WATER CIRCUIT (W models only)								
condenser type (W models only)						Brazed plate		
water connections ISO 7/1 (W models only)			inch	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼
Total water internal volume			l	8.98	8.98	11.08	5.34	7.98
DIMENSIONS								
width			mm	2550	2550	2550	1200	1750
depth			mm	890	890	890	890	890
height			mm	1970	1970	1970	2570	2570
footprint			m^2	2.2695	2.2695	2.2695	1.068	1.5575

Data refers to Standard Units without options, Premium Fan Module with clean F5 filters.
Standard ESP: Upflow 50Pa; Downflow Up 20Pa; Downflow Down 20 Pa Downflow Frontal 0Pa
For Downflow Up and Down versions the data refers to the height of the raised floor = 600mm
Performance data refers to Downflow Units, if not specified otherwise.

(1) IN THE FOLLOWING STANDARD CONDITIONS: Room conditions 24°C bs; 50% R.H. (17°C wb) — Condensing temperature: 45°C — Air flow of the units refers to the standard configuration with F5 class filter.

(2) Liebert PDX is able to adapt to the different site needs and working conditions. Performances in different working conditions, different airflows can be provided by Emerson Network Power representatives.

Technical data can be subject to change without notice.

Technical Data

Tab. 4b — Digital Scroll Cooling System direct expansion unit @ 100% cooling capacity, Premium Fan Module PXxxx A/W series

MODELS				PX041	PX045	PX047	PX051	PX057
Power supply voltage			V/Ph/Hz	400V ±10% / 3Ph / 50Hz				
Refrigerant circuit				single	single	single	single	single
PERFORMANCE LEGACY (1)(3)						**Air Condition: 24°C, R.H. 50%**		
air flow			m^3/h	10000	10900	14500	15800	16300
Refrigerant						R410A		
total gross cooling capacity			kW	39.7	43.8	48.2	51.9	58.6
sensible gross cooling capacity			kW	37.4	41.1	48.2	51.9	57.8
SHR (sensible/total ratio)			–	0.94	0.94	1	1	0.99
compressor power input			kW	8.47	9.59	10.66	11.22	12.75
compressor OA			A	15.6	18.2	14.94	21.82	24.8
Configuration	**Upflow**	Net Sensible cooling capacity	kW	36.3	39.5	45.6	48.5	55
		fan power input	kW	1.9	2.39	2x1.28	2x1.6	2x1.71
		unit power input	kW	10.41	12.02	13.25	14.45	16.2
	Downflow Up	Net Sensible cooling capacity	kW	35.5	38.7	45.7	48.8	54.5
		fan power input	kW	1.9	2.33	2x1.23	2x1.55	2x1.66
		unit power input	kW	10.4	11.95	13.15	14.35	16.1
	Downflow Down	Net Sensible cooling capacity	kW	35.7	38.9	46.1	49.3	55
		fan power input	kW	1.72	2.13	2x1.05	2x1.29	2x1.39
		unit power input	kW	10.22	11.75	12.79	13.83	15.56
	Downflow Frontal	Net Sensible cooling capacity	kW	35.6	38.7	45.3	48.3	53.3
		fan power input	kW	1.84	2.33	2x1.19	2x1.49	2x1.61
		unit power input	kW	10.34	11.95	13.07	14.23	16
Condensing section (W models only)								
water inlet temp: 30°C—condensation temp: 45°C								
water flow			l/s	0.907	1015	1130	1219	1359
water side pressure drop			kPa	11	13	16	19	18
PERFORMANCE SMART (2)(3)						**Air Condition: 35°C, R.H. 30%**		
air flow (4)			m^3/h	10000	10900	14500	15800	16300
Refrigerant						R410A		
total gross cooling capacity			kW	48.4	53.3	60.5	64.8	71.8
sensible gross cooling capacity			kW	48.4	53.3	60.5	64.8	71.8
SHR (sensible/total ratio)			–	1	1	1	1	1
compressor power input			kW	8.55	9.73	10.71	11.11	12.9
compressor OA			A	15.64	18.44	15.06	21.53	25.02
Configuration	**Upflow**	Net Sensible cooling capacity	kW	47	51.5	57.9	61.6	68.4
		fan power input	kW	1.9	2.39	2x1.28	2x1.6	2x1.71
		unit power input	kW	10.49	12.16	13.3	14.34	16.35
	Downflow Up	Net Sensible cooling capacity	kW	46.5	50.9	58	61.7	68.5
		fan power input	kW	1.9	2.39	2x1.23	2x1.55	2x1.66
		unit power input	kW	10.48	12.15	13.2	14.24	16.25
	Downflow Down	Net Sensible cooling capacity	kW	46.7	51.1	58.4	62.2	69
		fan power input	kW	1.72	2.13	2x1.05	2x1.29	2x1.39
		unit power input	kW	10.3	11.89	12.84	13.72	15.71
	Downflow Frontal	Net Sensible cooling capacity	kW	46.6	50.9	57.3	60.9	67.5
		fan power input	kW	1.84	2.33	2x1.19	2x1.49	2x1.61
		unit power input	kW	10.42	12.09	13.12	14.13	16.14
Condensing section (W models only)								
water inlet temp: 30°C—condensation temp: 45°C								
water flow			l/s	1089	1216	1391	1493	1638
water side pressure drop			kPa	16	19	25	28	26
FAN								
Quantity (Premium Fan Module)			no.	1	1	2	2	2
FLA			A	5	5	10	10	10
LRA			A	0.1	0.1	0.2	0.2	0.2
Quantity (Basic Fan Module, Fix speed)			no.	1	1	1	1	2
FLA			A	5	5	5	5	10
LRA			A	0.1	0.1	0.1	0.1	0.2
COMPRESSOR								
Quantity (Digital Scroll Cooling System)			no.	1	1	2	2	2
FLA			A	25	27	2x16.5	2x16.2	2x21
LRA			A	118	140	2x101	2x101	2x111
EVAPORATING COIL								
quantity / configuration			no.	1	1	1	1	1
pipes/fins						Copper/treated aluminum		
pitch fins			mm	1.8	1.8	1.8	1.8	1.8
rows			no.	6	6	4	4	4
front surface			m^2	1.1375	1.1375	1.825	1.825	1.825

Technical Data

MODELS		PX041	PX045	PX047	PX051	PX057
REFRIGERANT CONNECTIONS (A models only)		**Refrigerant connecting pipe diameter: see Tab. 12f, Chap. 12**				
gas line outlet (pipe to be welded, o.d.)	mm	22	22	22	22	22
liquid line inlet (pipe to be welded, o.d.)	mm	18	18	18	18	18
WATER CIRCUIT (W models only)						
condenser type (W models only)				Brazed plate		
water connections ISO 7/1 (W models only)	inch	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼
Total water internal volume	l	4.54	4.54	4.54	4.54	5.54
DIMENSIONS						
width	mm	1200	1200	1750	1750	1750
depth	mm	890	890	890	890	890
height	mm	1970	1970	1970	1970	1970
footprint	m^2	1.068	1.068	1.5575	1.5575	1.5575

Data refers to Standard Units without options, Premium Fan Module with clean F5 filters.
Standard ESP: Upflow 50Pa; Downflow Up 20Pa; Downflow Down 20 Pa Downflow Frontal 0Pa
For Downflow Up and Down versions the data refers to the height of the raised floor = 600mm
Performance data refers to Downflow Units, if not specified otherwise.

(1) IN THE FOLLOWING STANDARD CONDITIONS: Room conditions 24°C bs; 50% R.H. (17°C wb) – Condensing temperature: 45°C – Air flow of the units refers to the standard configuration with F5 class filter.

(2) IN THE FOLLOWING STANDARD CONDITIONS: Room conditions 35°C bs; 30% R.H. (21.4°C wb) – Condensing temperature: 45°C – Air flow of the units refers to the standard configuration with F5 class filter.

(3) Liebert PDX is able to adapt to the different site needs and working conditions. Performances in different working conditions, different airflows can be provided by Emerson Network Power representatives.

(4) The Airflow indicated in the Smart Performance is the unit nominal airflow.

Technical data can be subject to change without notice.

Technical Data

MODELS				PX044	PX054	PX062	PX074	PX068	PX082
Power supply voltage			V/Ph/Hz			400V ±10% / 3Ph / 50Hz			
Refrigerant circuit				double	double	double	double	double	double
PERFORMANCE LEGACY (1)(3)						**Air Condition: 24°C, R.H. 50%**			
air flow			m^3/h	12500	15500	16300	17600	18499	24000
Refrigerant						R410A			
total gross cooling capacity			kW	44.6	55	62.2	74.3	65.8	86.2
sensible gross cooling capacity			kW	44.2	54.5	59.4	67.5	64.7	83.8
SHR (sensible/total ratio)			–	0.99	0.99	0.95	0.91	0.98	0.97
compressor power input			kW	4.76+4.56	5.69+5.51	6.42+6.33	7.54+8.27	6.45+6.33	9.29+9.35
compressor OA			A	8.38+8.16	11.01+10.77	12.63+12.17	14.15+15.14	12.66+12.17	16.5+16.56
Configuration	**Upflow**	Net Sensible cooling capacity	kW	41.8	50.7	54.9	62.4	62.6	79.7
		fan power input	kW	2x1.07	2x1.75	2x1.99	2x2.44	3x0.95	3x1.76
		unit power input	kW	11.48	14.73	16.76	20.72	15.66	23.96
	Downflow Up	Net Sensible cooling capacity	kW	42.2	51.1	55.5	62.7	62.1	78.7
		fan power input	kW	2x0.99	2x1.71	2x1.94	2x2.38	3x0.88	3x1.71
		unit power input	kW	11.33	14.63	16.66	20.6	15.45	23.8
	Downflow Down	Net Sensible cooling capacity	kW	42.5	51.5	56.1	63.4	62.3	79.2
		fan power input	kW	2x0.84	2x1.49	2x1.66	2x2.02	3x0.8	3x1.55
		unit power input	kW	11.03	14.21	16.1	19.88	15.21	23.32
	Downflow Frontal	Net Sensible cooling capacity	kW	41.5	50.1	54.5	61.8	–	–
		fan power input	kW	2x0.92	2x1.65	2x1.88	2x2.32	–	–
		unit power input	kW	11.18	14.54	16.54	20.48	–	–
Condensing section (W models only)									
water inlet temp: 30°C—condensation temp: 45°C									
water flow			l/s	0.487+0.553	0.599+0.677	0.672+0.765	0.751+0.939	0.678+0.778	0.933+1.059
water side pressure drop			kPa	10+13	11+13	10+13	8+11	6+8	11+15
PERFORMANCE SMART (2)(3)						**Air Condition: 35°C, R.H. 30%**			
air flow (4)			m^3/h	12500	15500	16300	17600	18500	24000
Refrigerant						R410A			
total gross cooling capacity			kW	59.9	71.4	77.3	90.9	88.5	109.6
sensible gross cooling capacity			kW	59.9	71.4	77.3	90.8	88.5	109.6
SHR (sensible/total ratio)			–	1	1	1	1	1	1
compressor power input			kW	4.83+4.56	5.65+5.43	6.54+6.33	7.57+8.36	6.58+6.33	9.37+9.46
compressor OA			A	8.41+8.21	10.87+10.6	12.8+12.17	14.16+15.27	12.86+12.17	16.57+16.61
Configuration	**Upflow**	Net Sensible cooling capacity	kW	53.8	68.5	73	85.7	80.5	107.7
		fan power input	kW	2x1.07	2x1.75	2x1.99	2x2.44	3x0.95	3x1.76
		unit power input	kW	11.57	14.62	16.86	20.84	15.81	24.14
	Downflow Up	Net Sensible cooling capacity	kW	57.9	67.9	73.4	86.1	85.9	104.4
		fan power input	kW	2x0.99	2x1.70	2x1.94	2x2.38	3x0.88	3x1.71
		unit power input	kW	11.4	14.51	16.78	20.72	15.58	23.99
	Downflow Down	Net Sensible cooling capacity	kW	58.2	68.3	74	86.8	86.1	104.9
		fan power input	kW	2x0.84	2x1.49	2x1.66	2x2.02	3x0.8	3x1.55
		unit power input	kW	11.1	14.09	16.22	20	15.34	23.51
	Downflow Frontal	Net Sensible cooling capacity	kW	56.8	66.4	72.5	84.9	–	–
		fan power input	kW	2x0.92	2x1.65	2x1.88	2x2.32	–	–
		unit power input	kW	11.25	14.41	16.64	20.59	–	–
Condensing section (W models only)									
water inlet temp: 30°C—condensation temp: 45°C									
water flow			l/s	0.571+0.669	0.71+0.832	0.794+0.964	0.861+1.171	0.794+0.935	1.096+1.311
water side pressure drop			kPa	13+17	15+19	14+21	10+18	8+11	16+22
FAN									
Quantity (Premium Fan Module)			no.	2	2	2	2	3	3
FLA			A	10	10	10	10	15	15
LRA			A	0.2	0.2	0.2	0.2	0.3	0.3
Quantity (Basic Fan Module, Fix speed)			no.	1	1	2	2	2	2
FLA			A	5	5	10	10	10	10
LRA			A	0.1	0.1	0.2	0.2	0.2	0.2
COMPRESSOR									
Quantity (Digital Scroll Cooling System)			no.	2	2	2	2	2	4
FLA			A	2x15	2x16.2	2x21	2x25	2x21	4x15
LRA			A	2x75	2x101	2x111	2x118	2x111	4x75
EVAPORATING COIL									
quantity / configuration			no.	1	1	1	1	1	1
pipes/fins						Copper/treated aluminum			
pitch fins			mm	1.8	1.8	1.8	1.8	1.8	1.8
rows			no.	3+3	3+3	3+3	3+3	3+3	3+3
front surface			m^2	1.675	1.675	1.675	1.675	2.675	2.675

Technical Data

MODELS		PX044	PX054	PX062	PX074	PX068	PX082
REFRIGERANT CONNECTIONS (A models only)		**Refrigerant connecting pipe diameter: see Tab. 12f, Chap. 12**					
gas line outlet (pipe to be welded, o.d.)	mm	18/18	18/18	18/18	22/22	18/18	22/22
liquid line inlet (pipe to be welded, o.d.)	mm	18/18	18/18	18/18	18/18	18/18	18/18
WATER CIRCUIT (W models only)							
condenser type (W models only)				Brazed plate			
water connections ISO 7/1 (W models only)	inch	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼
Total water internal volume	l	5.42	6.1	6.76	8.98	8.98	8.98
DIMENSIONS							
width	mm	1750	1750	1750	1750	2550	2550
depth	mm	890	890	890	890	890	890
height	mm	1970	1970	1970	1970	1970	1970
footprint	m^2	1.5575	1.5575	1.5575	1.5575	2.2695	2.2695

Data refers to Standard Units without options, Premium Fan Module with clean F5 filters.
Standard ESP: Upflow 50Pa; Downflow Up 20Pa; Downflow Down 20 Pa Downflow Frontal 0Pa
For Downflow Up and Down versions the data refers to the height of the raised floor = 600mm
Performance data refers to Downflow Units, if not specified otherwise.

(1) IN THE FOLLOWING STANDARD CONDITIONS: Room conditions 24°C bs; 50% R.H. (17°C wb) – Condensing temperature: 45°C – Air flow of the units refers to the standard configuration with F5 class filter.

(2) IN THE FOLLOWING STANDARD CONDITIONS: Room conditions 35°C bs; 30% R.H. (21.4°C wb) – Condensing temperature: 45°C – Air flow of the units refers to the standard configuration with F5 class filter.

(3) Liebert PDX is able to adapt to the different site needs and working conditions. Performances in different working conditions, different airflows can be provided by Emerson Network Power representatives.

(4) The Airflow indicated in the Smart Performance is the unit nominal airflow.

Technical data can be subject to change without notice.

Technical Data

MODELS				PX094	PX104	PX120	PX059 EXT	PX092 EXT
Power supply voltage			V/Ph/Hz	400V ±10% / 3Ph / 50Hz				
Refrigerant circuit				double	double	double	single	double
PERFORMANCE LEGACY (1)(3)						**Air Condition: 24°C, R.H. 50%**		
air flow			m^3/h	26000	27000	27000	11200	17950
Refrigerant						R410A		
total gross cooling capacity			kW	97.7	104.2	123.3	57	91.8
sensible gross cooling capacity			kW	92.8	97.8	107.4	47.3	76
SHR (sensible/total ratio)			–	0.95	0.94	0.87	0.83	0.83
compressor power input			kW	10.64+10.68	11.22+11.2	12.72+14.82	12.74	9.52+11.26
compressor OA			A	14.9+15	21.85+21.76	24.76+28.14	24.78	18.11+22.25
Configuration	**Upflow**	Net Sensible cooling capacity	kW	87.6	91.9	101.6	45.2	72.4
		fan power input	kW	3x2.13	3x2.39	3x2.39	1.98	2x1.85
		unit power input	kW	27.75	29.61	34.75	14.74	24.5
	Downflow Up	Net Sensible cooling capacity	kW	86.4	90.8	100.4	44.9	72
		fan power input	kW	3x2.13	3x2.33	3x2.33	2.45	2x2.02
		unit power input	kW	27.74	29.44	34.56	15.22	24.85
	Downflow Down	Net Sensible cooling capacity	kW	87.1	91.5	101.2	45.1	72.7
		fan power input	kW	3x1.9	3x2.08	3x2.08	2.18	2x1.67
		unit power input	kW	27.05	28.69	33.81	14.95	24.15
	Downflow Frontal	Net Sensible cooling capacity	kW	–	–	–	–	–
		fan power input	kW	–	–	–	–	–
		unit power input	kW	–	–	–	–	–
Condensing section (W models only)								
water inlet temp: 30°C—condensation temp: 45°C								
water flow			l/s	1.071+1.217	1.149+1.299	1.266+1.626	1.325	0.934+1.221
water side pressure drop			kPa	15+19	18+21	16+25	18	11+20
PERFORMANCE SMART (2)(3)						**Air Condition: 35°C, R.H. 30%**		
air flow (4)			m^3/h	26000	27000	27000	11200	17950
Refrigerant						R410A		
total gross cooling capacity			kW	121.4	128.4	148	66.4	111
sensible gross cooling capacity			kW	121.4	128.3	148	66.4	110.5
SHR (sensible/total ratio)			–	1	1	1	1	1
compressor power input			kW	10.69+10.73	11.19+11.02	12.77+14.97	12.83	9.62+11.27
compressor OA			A	15.01+15.05	21.73+21.3	24.83+28.22	24.91	18.25+22.31
Configuration	**Upflow**	Net Sensible cooling capacity	kW	116.4	122.4	142.5	62.9	104.1
		fan power input	kW	3x2.13	3x2.39	3x2.39	1.98	2x1.85
		unit power input	kW	27.84	29.38	34.96	14.82	24.62
	Downflow Up	Net Sensible cooling capacity	kW	115	121.4	141	64	106.5
		fan power input	kW	3x2.13	3x2.33	3x2.33	2.38	2x2.09
		unit power input	kW	27.84	29.23	34.76	15.24	24.96
	Downflow Down	Net Sensible cooling capacity	kW	115.7	122.1	141.7	64.2	107.2
		fan power input	kW	3x1.9	3x2.08	3x2.08	2.18	2x1.67
		unit power input	kW	27.15	28.48	34.01	15.04	24.26
	Downflow Frontal	Net Sensible cooling capacity	kW	–	–	–	–	–
		fan power input	kW	–	–	–	–	–
		unit power input	kW	–	–	–	–	–
Condensing section (W models only)								
water inlet temp: 30°C—condensation temp: 45°C								
water flow			l/s	1.254+1.537	1.333+1.626	1.409+2.009	1522	1.056+1.506
water side pressure drop			kPa	20+30	23+33	20+38	23	15+28
FAN								
Quantity (Premium Fan Module)			no.	3	3	3	1	2
FLA			A	15	15	15	5	10
LRA			A	0.3	0.3	0.3	0.1	0.2
Quantity (Basic Fan Module, Fix speed)			no.	2	2	–	1	2
FLA			A	10	10	–	5	10
LRA			A	0.2	0.2	–	0.1	0.2
COMPRESSOR								
Quantity (Digital Scroll Cooling System)			no.	4	4	4	2	2
FLA			A	4x16.5	4x16.2	4x22	2x21	2x34
LRA			A	4x101	4x101	4x118	2x111	2x174
EVAPORATING COIL								
quantity / configuration			no.	1	1	1	1	1
pipes/fins						Copper/treated aluminum		
pitch fins			mm	1.8	1.8	1.8	1.8	1.8
rows			no.	3+3	3+3	3+3	6	3+3
front surface			m^2	2.675	2.675	2.675	1.53	2.412

Technical Data

MODELS		PX094	PX104	PX120	PX059 EXT	PX092 EXT
REFRIGERANT CONNECTIONS (A models only)		**Refrigerant connecting pipe diameter: see Tab. 12f, Chap. 12**				
gas line outlet (pipe to be welded, o.d.)	mm	22/22	22/22	22/22	22/22	22/22
liquid line inlet (pipe to be welded, o.d.)	mm	18/18	18/18	18	18/18	18/18
WATER CIRCUIT (W models only)						
condenser type (W models only)				Brazed plate		
water connections ISO 7/1 (W models only)	inch	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼
Total water internal volume	l	8.98	8.98	11.08	5.34	7.98
DIMENSIONS						
width	mm	2550	2550	2550	1200	1750
depth	mm	890	890	890	890	890
height	mm	1970	1970	1970	2570	2570
footprint	m^2	2.2695	2.2695	2.2695	1.068	1.5575

Data refers to Standard Units without options, Premium Fan Module with clean F5 filters.
Standard ESP: Upflow 50Pa; Downflow Up 20Pa; Downflow Down 20 Pa Downflow Frontal 0Pa
For Downflow Up and Down versions the data refers to the height of the raised floor = 600mm
Performance data refers to Downflow Units, if not specified otherwise.

(1) IN THE FOLLOWING STANDARD CONDITIONS: Room conditions 24°C bs; 50% R.H. (17°C wb) – Condensing temperature: 45°C – Air flow of the units refers to the standard configuration with F5 class filter.

(2) IN THE FOLLOWING STANDARD CONDITIONS: Room conditions 35°C bs; 30% R.H. (21.4°C wb) – Condensing temperature: 45°C – Air flow of the units refers to the standard configuration with F5 class filter.

(3) Liebert PDX is able to adapt to the different site needs and working conditions. Performances in different working conditions, different airflows can be provided by Emerson Network Power representatives.

(4) The Airflow indicated in the Smart Performance is the unit nominal airflow.

Technical data can be subject to change without notice.

Tab. 4c — Scroll Cooling System freecooling direct expansion unit @ 100% cooling capacity, Premium Fan Module PXxxx F series

MODELS				PX041	PX047	PX051	PX044	PX054
Power supply voltage			V/Ph/Hz			400V ±10% / 3Ph / 50Hz		
Refrigerant circuit				single	single	single	double	double
PERFORMANCE LEGACY (1)(2)						**Air Condition: 24°C, R.H. 50%**		
air flow			m^3/h	10000	13200	15200	12500	15300
ethylene glycol			%	30	30	30	30	30
proposed Dry Cooler				EST040	EST040	EST050	EST040	EST050
MECHANICAL COOLING PERFORMANCE (@ 35.0°C outdoor air temperature)								
Refrigerant						R410A		
total gross cooling capacity			kW	35.4	42	49.5	38.8	47.8
sensible gross cooling capacity			kW	35	42	49.5	38.8	47.8
SHR (sensible/total ratio)			–	0.99	1	1	1	1
compressor power input			kW	9.94	10.67	12.46	5.67+5.57	6.75+6.65
compressor OA			A	17.57	3.99	4.02	9.75+5.59	12.3+12.18
Configuration	**Upflow**	Net Sensible cooling capacity	kW	35.7	42	44.8	36	43.3
		fan power input	kW	2.41	2x1.35	2x1.91	2x1.33	2x2.19
		unit power input	kW	12.4	13.4	16.3	13.92	17.8
	Downflow Up	Net Sensible cooling capacity	kW	32.9	39.4	45.8	36.2	43.5
		fan power input	kW	2.41	2x1.3	2x1.85	2x1.28	2x2.14
		unit power input	kW	12.38	13.3	16.19	13.83	17.65
	Downflow Down	Net Sensible cooling capacity	kW	35	39.8	46.3	36.5	44.1
		fan power input	kW	2.15	2x1.13	2x1.59	2x1.11	2x1.86
		unit power input	kW	12.12	12.96	15.67	13.49	17.15
	Downflow Frontal	Net Sensible cooling capacity	kW	32.7	39	45.5	35.9	43.2
		fan power input	kW	2.28	2.42	3.5	2.4	4.04
		unit power input	kW	12.25	13.09	15.96	13.63	17.43
mixture flow			l/s	1397	1943	1987	0.708+0.708	0.78+0.78
mixture condenser pressure drop			kPa	18	32	34	20+20	17+17
unit total pressure drop			kPa	28	52	55	23+23	20+20
FREECOOLING PERFORMANCE (@ 5.0°C outdoor air temperature)								
total gross cooling capacity			kW	25.3	33.8	40.5	28.7	35.7
sensible gross cooling capacity			kW	25.3	33.8	40.5	28.7	35.7
SHR (sensible/total ratio)			–	1	1	1	1	1
Configuration	**Upflow**	Net Sensible cooling capacity	kW	23	31.3	36.9	26	31.3
		fan power input	kW	2.41	2x1.35	2x1.91	2x1.33	2x2.19
		unit power input	kW	2.44	2.73	3.85	2.69	4.41
	Downflow Up	Net Sensible cooling capacity	kW	22.9	31.2	36.7	26.1	31.4
		fan power input	kW	2.41	2x1.3	2x1.85	2x1.28	2x2.14
		unit power input	kW	2.44	2.63	3.73	2.59	4.31
	Downflow Down	Net Sensible cooling capacity	kW	23.2	31.7	37.5	26.4	31.9
		fan power input	kW	2.15	2x1.13	2x1.59	2x1.11	2x1.86
		unit power input	kW	2.18	2.29	3.21	2.25	3.75
	Downflow Frontal	Net Sensible cooling capacity	kW	23.1	31.6	37.3	26.3	31.6
		fan power input	kW	2.28	2.42	3.5	2.4	4.04
		unit power input	kW	2.31	2.45	3.53	2.43	4.07
mixture flow			l/s	1.4	1.94	1.99	1.42	1.56
unit total pressure drop			kPa	73	51	53	24	28
dry–cooler pressure drop			kPa	75	75	69	75	69
FAN								
Quantity (Premium Fan Module)			no.	1	1	1	2	2
FLA			A	5	5	5	10	10
LRA			A	0.1	0.1	0.1	0.2	0.2
Quantity (Basic Fan Module, Fix speed)			no.	1	1	1	1	1
FLA			A	5	5	5	5	5
LRA			A	0.1	0.1	0.1	0.1	0.1
COMPRESSOR								
Quantity (Scroll Cooling System)			no.	1	1	1	2	2
FLA			A	25	31	34	2x15	2x16.2
LRA			A	118	140	174	2x75	2x101
EVAPORATING COIL								
quantity / configuration			no.	1	1	1	1	1
pipes/fins						Copper/treated aluminum		
pitch fins			mm	1.8	1.8	1.8	1.8	1.8
rows			no.	5	4	4	2+3	2+3
front surface			m^2	0.978	1.626	1.626	1.482	1.482

Technical Data

MODELS		PX041	PX047	PX051	PX044	PX054
CHILLED WATER COIL						
quantity / configuration	no.	1	1	1	1	1
pipes/fins				Copper/treated aluminum		
pitch fins	mm	1.6	1.6	1.6	1.6	1.6
rows	no.	5	5	5	5	5
front surface	m^2	0.978	1.626	1.626	1.482	1.482
WATER CIRCUIT						
condenser type				Brazed plate		
water connections ISO 7/1	inch	Rp 1 ¼	Rp 1 ½	Rp 1 ½	Rp 1 ½	Rp 1 ½
Total water internal volume	l	21.44	32.04	32.04	31.92	32.6
DIMENSIONS						
width	mm	1200	1750	1750	1750	1750
depth	mm	890	890	890	890	890
height	mm	1970	1970	1970	1970	1970
footprint	m^2	1.068	1.5575	1.5575	1.5575	1.5575

Data refers to Standard Units without options, Premium Fan Module with clean F5 filters.
Standard ESP: Upflow 50Pa; Downflow Up 20Pa; Downflow Down 20 Pa Downflow Frontal 0Pa
For Downflow Up and Down versions the data refers to the height of the raised floor = 600mm
Performance data refers to Downflow Units, if not specified otherwise.

(1) IN THE FOLLOWING STANDARD CONDITIONS: Room conditions 24°C bs; 50% R.H. (17°C wb) – Condensing temperature: 45°C – Air flow of the units refers to the standard configuration with F5 class filter.

(2) Liebert PDX is able to adapt to the different site needs and working conditions. Performances in different working conditions, different airflows can be provided by Emerson Network Power representatives.

Technical data can be subject to change without notice.
** VICTAULIC® Connection.*
*** Optional. Threaded union on request*

Technical Data

MODELS				PX062	PX068	PX082	PX094	PX104
Power supply voltage			V/Ph/Hz	400V ±10% / 3Ph / 50Hz				
Refrigerant circuit				double	double	double	double	double
PERFORMANCE LEGACY (1)(2)						**Air Condition: 24°C, R.H. 50%**		
air flow			m^3/h	15900	18500	24000	25000	25000
ethylene glycol			%	30	30	30	30	30
proposed Dry Cooler				EST060	EST060	EST070	EST080	EST080
MECHANICAL COOLING PERFORMANCE (@ 35.0°C outdoor air temperature)								
Refrigerant						R410A		
total gross cooling capacity			kW	55.4	60.2	73	80.9	89.5
sensible gross cooling capacity			kW	55.3	60.2	73	78.7	86.5
SHR (sensible/total ratio)			–	1	1	1	0.97	0.97
compressor power input			kW	7.38+7.30	7.08+6.97	10.48+10.28	11.31+11.13	14.03+13.85
compressor OA			A	13.61+13.51	13.20+13.05	18.37+18.09	20.36+20.09	26.16+25.89
Configuration	**Upflow**	Net Sensible cooling capacity	kW	50.1	57	67.2	72.6	80.5
		fan power input	kW	2x2.39	3x1.15	3x2.16	3x2.41	3x2.42
		unit power input	kW	17.48	17.56	27.32	29.77	35.25
	Downflow Up	Net Sensible cooling capacity	kW	50.7	56.9	66.5	71.6	79.4
		fan power input	kW	2x2.33	3x1.11	3x2.16	3x2.35	3x2.35
		unit power input	kW	19.37	17.41	27.27	29.52	34.96
	Downflow Down	Net Sensible cooling capacity	kW	51.2	57.1	67.2	72.3	80.1
		fan power input	kW	2x2.04	3x1.03	3x1.93	3x2.12	3x2.12
		unit power input	kW	18.79	17.17	26.58	28.83	34.27
	Downflow Frontal	Net Sensible cooling capacity	kW	49.6	–	–	–	–
		fan power input	kW	4.42	–	–	–	–
		unit power input	kW	19.09	–	–	–	–
mixture flow			l/s	1.15+1.15	1.36+1.36	1.08+1.08	1.27+1.27	1.27+1.27
mixture condenser pressure drop			kPa	26+26	17+17	11+11	15+15	15+15
unit total pressure drop			kPa	33+33	27+27	17+17	23+23	23+23
FREECOOLING PERFORMANCE (@ 5.0°C outdoor air temperature)								
total gross cooling capacity			kW	37.7	47.2	51.1	56.7	56.3
sensible gross cooling capacity			kW	37.7	47.2	51.1	56.7	56.3
SHR (sensible/total ratio)			–	1	1	1	1	1
Configuration	**Upflow**	Net Sensible cooling capacity	kW	33.6	44.2	45.1	50	49.6
		fan power input	kW	2x2.39	3x1.15	3x2.16	3x2.41	3x2.42
		unit power input	kW	4.81	3.48	6.51	7.26	7.29
	Downflow Up	Net Sensible cooling capacity	kW	33	43.9	44.6	49.7	49.3
		fan power input	kW	2x2.33	3x1.11	3x2.16	3x2.35	3x2.35
		unit power input	kW	4.69	3.36	6.51	7.18	7.18
	Downflow Down	Net Sensible cooling capacity	kW	34.3	44.5	45.8	50.9	50.5
		fan power input	kW	2x2.04	3x1.03	3x1.93	3x2.12	3x2.12
		unit power input	kW	4.11	3.11	5.82	6.39	6.39
	Downflow Frontal	Net Sensible cooling capacity	kW	34	–	–	–	–
		fan power input	kW	4.42	–	–	–	–
		unit power input	kW	4.45	–	–	–	–
mixture flow			l/s	2.3	2.72	2.16	2.54	2.54
unit total pressure drop			kPa	57	38	25	34	34
dry–cooler pressure drop			kPa	21	20	43	27	27
FAN								
Quantity (Premium Fan Module)			no.	2	3	3	3	3
FLA			A	10	15	15	15	15
LRA			A	0.2	0.3	0.3	0.3	0.3
Quantity (Basic Fan Module, Fix speed)			no.	2	2	2	2	2
FLA			A	10	10	10	10	10
LRA			A	0.2	0.2	0.2	0.2	0.2
COMPRESSOR								
Quantity (Scroll Cooling System)			no.	2	2	2	2	2
FLA			A	2x21	2x21	2x25	2x31	2x34
LRA			A	2x111	2x111	2x118	2x140	2x174
EVAPORATING COIL								
quantity / configuration			no.	1	1	1	1	1
pipes/fins						Copper/treated aluminum		
pitch fins			mm	1.8	1.8	1.8	1.8	1.8
rows			no.	2+3	2+3	2+3	2+3	2+3
front surface			m^2	1.482	2.442	2.442	2.442	2.442
CHILLED WATER COIL								
quantity / configuration			no.	1	1	1	1	1
pipes/fins						Copper/treated aluminum		
pitch fins			mm	1.6	1.6	1.6	1.6	1.6
rows			no.	5	5	5	5	5
front surface			m^2	1.482	2.442	2.442	2.442	2.442

Technical Data

MODELS		PX062	PX068	PX082	PX094	PX104
WATER CIRCUIT						
condenser type				Brazed plate		
water connections ISO 7/1	inch	Rp 1 ½		O. D. 54 mm* R 2**		
Total water internal volume	l	33.26	53.08	53.08	53.08	53.08
DIMENSIONS						
width	mm	1750	2550	2550	2550	2550
depth	mm	890	890	890	890	890
height	mm	1970	1970	1970	1970	1970
footprint	m^2	1.5575	2.2695	2.2695	2.2695	2.2695

Data refers to Standard Units without options, Premium Fan Module with clean F5 filters.
Standard ESP: Upflow 50Pa; Downflow Up 20Pa; Downflow Down 20 Pa Downflow Frontal 0Pa
For Downflow Up and Down versions the data refers to the height of the raised floor = 600mm
Performance data refers to Downflow Units, if not specified otherwise.

(1) IN THE FOLLOWING STANDARD CONDITIONS: Room conditions 24°C bs; 50% R.H. (17°C wb) – Condensing temperature: 45°C – Air flow of the units refers to the standard configuration with F5 class filter.

(2) Liebert PDX is able to adapt to the different site needs and working conditions. Performances in different working conditions, different airflows can be provided by Emerson Network Power representatives.

Technical data can be subject to change without notice.
** VICTAULIC® Connection.*
*** Optional. Threaded union on request*

Tab. 4d — Digital Scroll Cooling System freecooling direct expansion unit @ 100% cooling capacity, Premium Fan Module

PXxxx F series

MODELS				PX041	PX047	PX051	PX044	PX054
Power supply voltage			V/Ph/Hz			400V ±10% / 3Ph / 50Hz		
Refrigerant circuit				single	single	single	double	double
PERFORMANCE LEGACY (1)(3)						**Air Condition: 24°C, R.H. 50%**		
air flow			m^3/h	10000	13200	15200	12500	15300
ethylene glycol			%	30	30	30	30	30
proposed Dry Cooler				EST040	EST040	EST050	EST040	EST050
MECHANICAL COOLING PERFORMANCE (@ 35.0°C outdoor air temperature)								
Refrigerant						R410A		
total gross cooling capacity			kW	34.9	43.6	48.2	38.6	47.7
sensible gross cooling capacity			kW	34.7	43.6	48.2	38.6	47.7
SHR (sensible/total ratio)			–	1	1	1	1	1
compressor power input			kW	10.17	12.51	12.48	5.77+5.67	6.84+6.75
compressor OA			A	17.87	16.62	23.37	9.8+9.75	12.45+12.3
Configuration	**Upflow**	Net Sensible cooling capacity	kW	32.8	40.9	44.4	35.8	43.1
		fan power input	A	2.41	2X1.35	2X1.91	2X1.33	2X1.19
		unit power input	kW	12.63	15.23	16.33	14.12	17.99
	Downflow Up	Net Sensible cooling capacity	kW	32.3	41	44.5	36	43.4
		fan power input	A	2.41	2X1.3	2X1.85	2X1.28	2.14
		unit power input	kW	12.61	15.14	16.21	14.03	17.9
	Downflow Down	Net Sensible cooling capacity	kW	32.6	41.4	45	36.4	43.9
		fan power input	A	2.15	2X1.13	2X1.59	2X1.11	2X1.86
		unit power input	kW	12.35	14.8	3.21	13.69	17.34
	Downflow Frontal	Net Sensible cooling capacity	kW	32.4	40.8	43.3	35.8	43
		fan power input	A	2.28	2X1.21	2X1.75	2X1.2	2X2.02
		unit power input	kW	12.48	14.92	3.53	13.83	17.62
mixture flow			l/s	1397	1943	1987	0.708+0.708	0.78+0.78
mixture condenser pressure drop			kPa	18	32	34	20+20	17+17
unit total pressure drop			kPa	28	52	55	23+23	20+20
FREECOOLING PERFORMANCE (@ 5.0°C outdoor air temperature)								
total gross cooling capacity			kW	25.4	33.9	39	28	35.6
sensible gross cooling capacity			kW	25.4	33.9	39	28	35.6
SHR (sensible/total ratio)			–	1	1	1	1	1
Configuration	**Upflow**	Net Sensible cooling capacity	kW	23	30.4	35.2	26.1	31.3
		fan power input	A	2.41	2X1.35	2X1.91	2X1.33	2X2.19
		unit power input	kW	2.44	2.73	3.85	2.69	4.41
	Downflow Up	Net Sensible cooling capacity	kW	23	30.5	35.3	25.4	31.4
		fan power input	A	2.41	2X1.3	2X1.85	2X1.28	2X2.14
		unit power input	kW	2.44	2.63	3.73	2.59	4.31
	Downflow Down	Net Sensible cooling capacity	kW	23.2	30.8	35.8	26.4	31.9
		fan power input	A	2.15	2X1.13	2X1.59	2X1.11	2X1.86
		unit power input	kW	2.18	2.29	3.21	2.25	3.75
	Downflow Frontal	Net Sensible cooling capacity	kW	23.1	30.6	35.5	26.3	31.7
		fan power input	A	2.28	2X1.21	2X1.75	2X1.2	2X2.02
		unit power input	kW	2.31	2.45	3.53	2.43	4.07
mixture flow			l/s	1.4	1.94	1.99	1.42	1.56
unit total pressure drop			kPa	73	51	53	24	28
dry–cooler pressure drop			kPa	32	32	29	32	29
PERFORMANCE SMART (2)(3)						**Air Condition: 35°C, R.H. 30%**		
air flow(4)			m^3/h	10000	13200	15200	12500	15300
ethylene glycol			%	30	30	30	30	30
proposed Dry Cooler				EST040	EST040	EST050	EST040	EST050
MECHANICAL COOLING PERFORMANCE (@ 35.0°C outdoor air temperature)								
Refrigerant						R410A		
total gross cooling capacity			kW	42.5	53.9	59.7	47.9	59
sensible gross cooling capacity			kW	42.5	53.9	59.7	47.9	59
SHR (sensible/total ratio)			–	1	1	1	1	1
compressor power input			kW	10.66	13.26	13.01	6.18+6.09	7.2+7.18
compressor OA			A	18.53	17.42	23.91	10.31+10.44	12.85+12.82
Configuration	**Upflow**	Net Sensible cooling capacity	kW	40.6	51.2	55.9	45.2	54.4
		fan power input	A	2.41	2x1.35	2x1.91	2x1.37	2x2.19
		unit power input	kW	13.13	15.99	16.86	15.01	18.78
	Downflow Up	Net Sensible cooling capacity	kW	40.1	51.3	56	45.4	54.8
		fan power input	A	2.41	2x1.3	2x1.85	2x1.28	2x2.14
		unit power input	kW	13.1	15.89	16.74	14.86	18.69
	Downflow Down	Net Sensible cooling capacity	kW	40.3	51.7	56.6	45.6	55.3
		fan power input	A	2.15	2x1.13	2x1.59	2x1.16	2x1.86
		unit power input	kW	12.84	15.55	16.22	14.62	18.13
	Downflow Frontal	Net Sensible cooling capacity	kW	40.2	50.9	55.4	45	54.2
		fan power input	A	2.28	2x1.21	2x1.75	2x1.20	2x2.02
		unit power input	kW	12.97	15.67	16.51	14.68	18.4

Technical Data

MODELS				PX041	PX047	PX051	PX044	PX054
mixture flow			l/s	1397	1943	1987	0.708+0.708	0.78+0.78
mixture condenser pressure drop			kPa	18	32	34	20+20	17+17
unit total pressure drop			kPa	28	52	55	23+23	20+20
FREECOOLING PERFORMANCE (@ 5.0°C outdoor air temperature)								
total gross cooling capacity			kW	40.9	54.8	65.7	47.2	58.7
sensible gross cooling capacity			kW	40.9	54.8	65.7	47.2	58.7
SHR (sensible/total ratio)			–	1	1	1	1	1
Configuration	**Upflow**	Net Sensible cooling capacity	kW	38.4	52.1	61.8	44.5	53.3
		fan power input	A	2.41	2x1.35	2x1.91	2x1.37	2x1.19
		unit power input	kW	2.44	2.73	3.85	2.77	4.41
	Downflow Up	Net Sensible cooling capacity	kW	38.5	52.2	62	44.7	54.4
		fan power input	A	2.41	2x1.3	2x1.85	2x1.28	2x2.14
		unit power input	kW	2.44	2.63	3.73	2.59	4.31
	Downflow Down	Net Sensible cooling capacity	kW	38.7	52.5	62.5	44.9	53.9
		fan power input	A	2.15	2x2.13	2x1.59	2x1.16	2x1.86
		unit power input	kW	2.18	2.29	3.21	2.35	3.75
	Downflow Frontal	Net Sensible cooling capacity	kW	38.6	52.4	62.2	44.8	53.6
		fan power input	A	2.28	2x1.21	2x1.75	2x1.20	2x2.02
		unit power input	kW	2.31	2.45	3.53	2.43	4.07
mixture flow			l/s	1.4	1.94	1.99	1.42	1.56
unit total pressure drop			kPa	72	49	52	23	27
dry–cooler pressure drop			kPa	30	30	28	30	28
FAN								
Quantity (Premium Fan Module)			no.	1	2	2	2	2
FLA			A	5	10	10	10	10
LRA			A	0.1	0.2	0.2	0.2	0.2
Quantity (Basic Fan Module, Fix speed)			no.	1	1	1	1	1
FLA			A	5	5	5	5	5
LRA			A	0.1	0.1	0.1	0.1	0.1
COMPRESSOR								
Quantity (Digital Scroll Cooling System)			no.	1	2	2	2	2
FLA			A	25	2x16.5	2x16.2	2x15	2x16.2
LRA			A	118	2x101	2x101	2x75	2x101
EVAPORATING COIL								
quantity / configuration			no.	1	1	1	1	1
pipes/fins					Copper/treated aluminum			
pitch fins			mm	1.8	1.8	1.8	1.8	1.8
rows			no.	5	4	4	2+3	2+3
front surface			m^2	0.978	1.626	1.626	1.482	1.482
CHILLED WATER COIL								
quantity / configuration			no.	1	1	1	1	1
pipes/fins					Copper/treated aluminum			
pitch fins			mm	1.6	1.6	1.6	1.6	1.6
rows			no.	5	5	5	5	5
front surface			m^2	0.978	1.626	1.626	1.482	1.482
WATER CIRCUIT								
condenser type						Brazed plate		
water connections ISO 7/1			inch	Rp 1 ¼	Rp 1 ½	Rp 1 ½	Rp 1 ½	Rp 1 ½
Total water internal volume			l	21.44	32.04	32.04	31.92	32.6
DIMENSIONS								
width			mm	1200	1750	1750	1750	1750
depth			mm	890	890	890	890	890
height			mm	1970	1970	1970	1970	1970
footprint			m^2	1.068	1.5575	1.5575	1.5575	1.5575

Data refers to Standard Units without options, Premium Fan Module with clean F5 filters.
Standard ESP: Upflow 50Pa; Downflow Up 20Pa; Downflow Down 20 Pa Downflow Frontal 0Pa
For Downflow Up and Down versions the data refers to the height of the raised floor = 600mm
Performance data refers to Downflow Units, if not specified otherwise.

(1) IN THE FOLLOWING STANDARD CONDITIONS: Room conditions 24°C bs; 50% R.H. (17°C wb) – Condensing temperature: 45°C – Air flow of the units refers to the standard configuration with F5 class filter.

(2) IN THE FOLLOWING STANDARD CONDITIONS: Room conditions 35°C bs; 30% R.H. (21.4°C wb) – Condensing temperature: 45°C – Air flow of the units refers to the standard configuration with F5 class filter.

(3) Liebert PDX is able to adapt to the different site needs and working conditions. Performances in different working conditions, different airflows can be provided by Emerson Network Power representatives.

(4) The Airflow indicated in the Smart Performance is the unit nominal airflow.

Technical data can be subject to change without notice.
** VICTAULIC® Connection.*
*** Optional. Threaded union on request*

Technical Data

MODELS				PX062	PX068	PX082	PX094	PX104
Power supply voltage			V/Ph/Hz			400V ±10% / 3Ph / 50Hz		
Refrigerant circuit				double	double	double	double	double
PERFORMANCE LEGACY (1)(3)						**Air Condition: 24°C, R.H. 50%**		
air flow			m^3/h	15900	18500	24000	25000	25000
ethylene glycol			%	30	30	30	30	30
proposed Dry Cooler				EST060	EST060	EST070	EST080	EST080
MECHANICAL COOLING PERFORMANCE (@ 35.0°C outdoor air temperature)								
Refrigerant						R410A		
total gross cooling capacity			kW	55.1	59.8	73.3	84	87.8
sensible gross cooling capacity			kW	55.1	59.8	73.3	83.8	85.6
SHR (sensible/total ratio)			–	1	1	1	1	0.98
compressor power input			kW	7.46+7.38	7.13+7.08	11.56+11.82	13.08+13.28	14.03+14.2
compressor OA			A	13.93+13.61	13.51+13.2	19.71+20.08	1719+17.4	25.32+25.53
Configuration	**Upflow**	Net Sensible cooling capacity	kW	49.9	56.9	67.6	77.5	79.9
		fan power input	A	2x2.39	3x1.15	3x2.16	3x2.41	3x2.41
		unit power input	kW	19.65	17.7	29.91	33.75	35.58
	Downflow Up	Net Sensible cooling capacity	kW	50.4	56.5	66.8	77	78.6
		fan power input	A	2X2.33	3x1.11	3x2.16	3x2.35	3x2.35
		unit power input	kW	19.53	17.57	29.89	33.44	35.31
	Downflow Down	Net Sensible cooling capacity	kW	51	56.7	67.6	77.5	79.3
		fan power input	A	2x2.04	3x1.03	3x1.93	3x2.12	3x2.12
		unit power input	kW	18.95	17.33	29.5	32.81	34.62
	Downflow Frontal	Net Sensible cooling capacity	kW	49.5	–	–	–	–
		fan power input	A	2x2.21	–	–	–	–
		unit power input	kW	19.24	–	–	–	–
mixture flow			l/s	1.149+1.149	1.359+1.359	1.08+1.08	1.267+1.267	1.267+1.267
mixture condenser pressure drop			kPa	26+26	17+17	11+11	15+15	15+15
unit total pressure drop			kPa	33+33	27+27	17+17	23+23	23+23
FREECOOLING PERFORMANCE (@ 5.0°C outdoor air temperature)								
total gross cooling capacity			kW	40.6	49.4	52.1	59.3	59.3
sensible gross cooling capacity			kW	40.6	49.4	52.1	59.3	59.3
SHR (sensible/total ratio)			–	1	1	1	1	1
Configuration	**Upflow**	Net Sensible cooling capacity	kW	35.8	45.6	46.8	52.1	52
		fan power input	A	2x2.39	3x1.15	3x2.16	3x2.41	3x2.41
		unit power input	kW	4.81	3.48	6.51	7.25	7.25
	Downflow Up	Net Sensible cooling capacity	kW	35.9	46.1	45.6	52.3	52.2
		fan power input	A	2X2.33	3x1.11	3x2.16	3x2.35	3x2.35
		unit power input	kW	4.69	3.36	6.51	7.08	7.08
	Downflow Down	Net Sensible cooling capacity	kW	36.5	46	46.8	53	52.8
		fan power input	A	2x2.04	3x1.03	3x1.93	3x2.12	3x2.12
		unit power input	kW	4.11	3.13	5.82	6.39	6.39
	Downflow Frontal	Net Sensible cooling capacity	kW	36.2	–	–	–	–
		fan power input	A	2x2.21	–	–	–	–
		unit power input	kW	4.45	–	–	–	–
mixture flow			l/s	2.3	2.72	2.16	2.54	2.54
unit total pressure drop			kPa	57	38	25	33	34
dry–cooler pressure drop			kPa	9	9	18	12	12
PERFORMANCE SMART (2)(3)						**Air Condition: 35°C, R.H. 30%**		
air flow(4)			m^3/h	15900	18500	24000	25000	25000
ethylene glycol			%	30	30	30	30	30
proposed Dry Cooler				EST060	EST060	EST070	EST080	EST080
MECHANICAL COOLING PERFORMANCE (@ 35.0°C outdoor air temperature)								
Refrigerant						R410A		
total gross cooling capacity			kW	67.4	74.6	90.6	102.9	106.3
sensible gross cooling capacity			kW	67.4	74.6	90.6	102.9	106.3
SHR (sensible/total ratio)			–	1	1	1	1	1
compressor power input			kW	7.91+7.82	7.63+7.47	12.44+12.76	13.91+14.29	14.79+15.13
compressor OA			A	14.51+14.23	14.15+13.75	20.96+21.42	18.1+18.53	26.26+26.67
Configuration	**Upflow**	Net Sensible cooling capacity	kW	62.4	71.7	85	96.7	100.2
		fan power input	A	2x2.39	3x1.19	3x2.16	3x2.41	3x2.41
		unit power input	kW	20.49	18.68	31.78	35.56	37.25
	Downflow Up	Net Sensible cooling capacity	kW	62.8	71.3	84.1	95.8	99.2
		fan power input	A	2x2.33	3x1.11	3x2.16	3x2.35	3x2.35
		unit power input	kW	20.42	18.46	31.71	35.28	37
	Downflow Down	Net Sensible cooling capacity	kW	63.4	71.5	84.8	96.5	102.7
		fan power input	A	2x2.04	3x1.03	3x1.93	3x2.12	3x1.2
		unit power input	kW	19.84	18.22	31.02	34.59	33.55
	Downflow Frontal	Net Sensible cooling capacity	kW	61.9	–	–	–	–
		fan power input	A	2x2.27	–	–	–	–
		unit power input	kW	20.22	–	–	–	–
mixture flow			l/s	1149	1.359+1.359	1.08+1.08	1.267+1.267	1.267+1.267
mixture condenser pressure drop			kPa	26+26	17+17	11+11	15+15	15+15
unit total pressure drop			kPa	33+33	27+27	17+17	23+23	23+23

Technical Data

MODELS				PX062	PX068	PX082	PX094	PX104
FREECOOLING PERFORMANCE (@ 5.0°C outdoor air temperature)								
total gross cooling capacity			kW	60	80.1	86.8	97.9	96.8
sensible gross cooling capacity			kW	60	80.1	86.8	97.9	96.8
SHR (sensible/total ratio)			–	1	1	1	1	1
Configuration	**Upflow**	Net Sensible cooling capacity	kW	60.8	76.5	80.6	89.7	89.5
		fan power input	A	2x2.39	3x1.19	3x2.16	3x2.41	3x2.41
		unit power input	kW	4.81	3.6	6.51	7.25	7.25
	Downflow Up	Net Sensible cooling capacity	kW	60.9	76.8	80.3	90.8	89.8
		fan power input	A	2x2.33	3x1.11	3x2.16	3x2.35	3x2.35
		unit power input	kW	4.69	3.36	6.51	7.08	7.08
	Downflow Down	Net Sensible cooling capacity	kW	61.4	77	81.3	90.6	90.4
		fan power input	A	2x2.03	3x1.03	3x1.93	3x2.12	3x2.12
		unit power input	kW	4.11	3.12	5.82	6.39	6.39
	Downflow Frontal	Net Sensible cooling capacity	kW	61.1	–	–	–	–
		fan power input	A	2x2.27	–	–	–	–
		unit power input	kW	4.57	–	–	–	–
mixture flow			l/s	2.3	2.72	2.16	2.54	2.54
unit total pressure drop			kPa	55	37	24	33	33
dry–cooler pressure drop			kPa	8	8	18	11	11
FAN								
Quantity (Premium Fan Module)			no.	2	3	3	3	3
FLA			A	10	15	15	15	15
LRA			A	0.2	0.3	0.3	0.3	0.3
Quantity (Basic Fan Module, Fix speed)			no.	2	2	2	2	2
FLA			A	10	10	10	10	10
LRA			A	0.2	0.2	0.2	0.2	0.2
COMPRESSOR								
Quantity (Digital Scroll Cooling System)			no.	2	2	4	4	4
FLA			A	2x21	2x21	4x15	4x15.5	4x16.2
LRA			A	2x111	2x111	4x75	4x101	4x101
EVAPORATING COIL								
quantity / configuration			no.	1	1	1	1	1
pipes/fins					Copper/treated aluminum			
pitch fins			mm	1.8	1.8	1.8	1.8	1.8
rows			no.	2+3	2+3	2+3	2+3	2+3
front surface			m^2	1.482	2.442	2.442	2.442	2.442
CHILLED WATER COIL								
quantity / configuration			no.	1	1	1	1	1
pipes/fins					Copper/treated aluminum			
pitch fins			mm	1.6	1.6	1.6	1.6	1.6
rows			no.	5	5	5	5	5
front surface			m^2	1.482	2.442	2.442	2.442	2.442
WATER CIRCUIT								
condenser type						Brazed plate		
water connections ISO 7/1			inch	Rp 1 ½		O. D. 54 mm* R 2**		
Total water internal volume			l	33.26	53.08	53.08	53.08	53.08
DIMENSIONS								
width			mm	1750	2550	2550	2550	2550
depth			mm	890	890	890	890	890
height			mm	1970	1970	1970	1970	1970
footprint			m^2	1.5575	2.2695	2.2695	2.2695	2.2695

Data refers to Standard Units without options, Premium Fan Module with clean F5 filters.
Standard ESP: Upflow 50Pa; Downflow Up 20Pa; Downflow Down 20 Pa Downflow Frontal 0Pa
For Downflow Up and Down versions the data refers to the height of the raised floor = 600mm
Performance data refers to Downflow Units, if not specified otherwise.

(1) IN THE FOLLOWING STANDARD CONDITIONS: Room conditions 24°C bs; 50% R.H. (17°C wb) – Condensing temperature: 45°C – Air flow of the units refers to the standard configuration with F5 class filter.

(2) IN THE FOLLOWING STANDARD CONDITIONS: Room conditions 35°C bs; 30% R.H. (21.4°C wb) – Condensing temperature: 45°C – Air flow of the units refers to the standard configuration with F5 class filter.

(3) Liebert PDX is able to adapt to the different site needs and working conditions. Performances in different working conditions, different airflows can be provided by Emerson Network Power representatives.

(4) The Airflow indicated in the Smart Performance is the unit nominal airflow.

Technical data can be subject to change without notice.
** VICTAULIC® Connection.*
*** Optional. Threaded union on request*

Technical Data

Tab. 4e — Scroll Cooling System dualfluid direct expansion unit @ 100% cooling capacity, Premium Fan Module PXxxx D/H series

MODELS				PX041	PX047	PX051	PX044	PX054
Power supply voltage			V/Ph/Hz	400V ±10% / 3Ph / 50Hz				
Refrigerant circuit				single	single	single	double	double
PERFORMANCE LEGACY (1)(2)				**Air Condition: 24°C, R.H. 50%**				
air flow			m^3/h	10000	13200	15200	12500	15300
ethylene glycol			%	0	0	0	0	0
MECHANICAL COOLING PERFORMANCE (1)								
Refrigerant						R410A		
total gross cooling capacity			kW	38.7	45.3	52	42.8	52.3
sensible gross cooling capacity			kW	36.5	45.3	52	42.7	52.2
SHR (sensible/total ratio)			–	0.94	1	1	1	1
compressor power input			kW	8.26	9.32	11.26	4.55+4.55	5.53+5.53
compressor OA			A	15.13	17.44	22.25	8.15+8.14	10.81+10.82
Configuration	**Upflow**	Net Sensible cooling capacity	kW	34.7	42.6	48.2	39.9	47.8
		fan power input	A	1.78	2x1.35	2x1.91	2x1.37	2x2.25
		unit power input	kW	10.07	12.05	15.11	11.87	15.59
	Downflow Up	Net Sensible cooling capacity	kW	34.1	42.7	48.3	40.1	47.8
		fan power input	A	2.47	2x1.3	2x1.85	2x1.33	2x2.19
		unit power input	kW	10.76	11.95	14.99	11.79	15.47
	Downflow Down	Net Sensible cooling capacity	kW	34.3	43	48.7	43	48.4
		fan power input	A	2.22	2x1.13	2x1.64	2x1.61	2x1.91
		unit power input	kW	10.51	11.63	14.57	11.45	14.91
	Downflow Frontal	Net Sensible cooling capacity	kW	34.8	42.4	47.9	39.8	47.5
		fan power input	A	1.53	2x1.21	2x1.75	2x1.24	2x2.08
		unit power input	kW	9.82	11.77	14.79	11.61	15.25
Condensing section (H models only)								
water inlet temp: 30°C—condensation temp: 45°C								
water flow			l/s	0.882	1041	1223	0.513+0.484	0.621+0.594
water side pressure drop			kPa	17	12	16	10+10	11+10
CHILLED WATER PERFORMANCE (1)								
total gross cooling capacity			kW	37.6	53.9	59.5	49.2	56.7
sensible gross cooling capacity			kW	35.3	48.8	54.9	45.3	53.7
SHR (sensible/total ratio)			–	0.94	0.91	0.92	0.92	0.94
Configuration	**Upflow**	Net Sensible cooling capacity	kW	33.6	46.1	51.1	42.6	49.1
		fan power input	A	1.78	2x1.35	1x1.91	2x1.37	2x2.25
		unit power input	kW	1.81	2.73	3.85	2.77	4.53
	Downflow Up	Net Sensible cooling capacity	kW	32.9	46.2	51.2	42.6	49.3
		fan power input	A	2.47	2x1.3	2x1.85	2x1.33	2x2.19
		unit power input	kW	2.5	2.63	3.73	2.69	4.41
	Downflow Down	Net Sensible cooling capacity	kW	33.1	46.5	51.6	43	49.8
		fan power input	A	2.22	2x1.13	2x1.64	2x1.61	2x1.91
		unit power input	kW	2.25	2.29	3.31	2.35	3.85
	Downflow Frontal	Net Sensible cooling capacity	kW	33.8	46.4	51.4	42.8	49.5
		fan power input	A	1.53	2x1.21	2x1.75	2x1.24	2x2.08
		unit power input	kW	1.56	2.45	3.53	2.51	4.19
mixture flow			l/s	1.79	2.57	2.84	2.35	2.7
unit total pressure drop			kPa	100	71	85	50	65
FAN								
Quantity (Premium Fan Module)			no.	1	1	1	2	2
FLA			A	5	5	5	10	10
LRA			A	0.1	0.1	0.1	0.2	0.2
Quantity (Basic Fan Module, Fix speed)			no.	1	1	1	1	1
FLA			A	5	5	5	5	5
LRA			A	0.1	0.1	0.1	0.1	0.1
COMPRESSOR								
Quantity (Scroll Cooling System)			no.					
FLA			A	25	31	34	2x15	2x16.2
LRA			A	118	140	174	2x75	2x101
EVAPORATING COIL								
quantity / configuration			no.	1	1	1	1	1
pipes/fins					Copper/treated aluminum			
pitch fins			mm	1.8	1.8	1.8	1.8	1.8
rows			no.	5	4	4	2+2	2+3
front surface			m^2	0.978	1.626	1.626	1.482	1.482
CHILLED WATER COIL								
quantity / configuration			no.	1	1	1	1	1
pipes/fins					Copper/treated aluminum			
pitch fins			mm	1.6	1.6	1.6	1.6	1.6
rows			no.	5	5	5	5	5
front surface			m^2	0.978	1.626	1.626	1.482	1.482

Technical Data

MODELS		PX041	PX047	PX051	PX044	PX054
REFRIGERANT CONNECTIONS (D models only)		**Refrigerant connecting pipe diameter: see Tab. 12f, Chap. 12**				
gas line outlet (pipe to be welded, o.d.)	mm	22	22	22	18/18	18/18
liquid line inlet (pipe to be welded, o.d.)	mm	18	18	18	18/18	18/18
WATER CIRCUIT CONDENSER (H models only)						
condenser type				Brazed plate		
water connections ISO 7/1	inch	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼
Total water internal volume	l	4.14	4.14	4.14	5.12	5.8
CHILLED WATER CONTENT ISO 7/1	inch	Rp 1 ¼	Rp 1 ½	Rp 1 ½	Rp 1 ½	Rp 1 ½
Total water internal volume	l	17.6	27.9	27.9	25.9	25.9
DIMENSIONS						
width	mm	1200	1750	1750	1750	1750
depth	mm	890	890	890	890	890
height	mm	1970	1970	1970	1970	1970
footprint	m^2	1.068	1.5575	1.5575	1.5575	1.5575

Data refers to Standard Units without options, Premium Fan Module with clean F5 filters.
Standard ESP: Upflow 50Pa; Downflow Up 20Pa; Downflow Down 20 Pa Downflow Frontal 0Pa
For Downflow Up and Down versions the data refers to the height of the raised floor = 600mm
Performance data refers to Downflow Units, if not specified otherwise.

(1) IN THE FOLLOWING STANDARD CONDITIONS: Room conditions 24°C bs; 50% R.H. (17°C wb) – Condensing temperature: 45°C – CW mode water temperature inlet/outlet 7/12 °C – Air flow of the units refers to the standard configuration with F5 class filter.

(2) Liebert PDX is able to adapt to the different site needs and working conditions. Performances in different working conditions, different airflows can be provided by Emerson Network Power representatives.

Technical data can be subject to change without notice.
** VICTAULIC® Connection.*
*** Optional. Threaded union on request*

Technical Data

MODELS				PX062	PX068	PX082	PX094	PX104
Power supply voltage			V/Ph/Hz	400V ±10% / 3Ph / 50Hz				
Refrigerant circuit				double	double	double	double	double
PERFORMANCE LEGACY (1)(2)						**Air Condition: 24°C, R.H. 50%**		
air flow			m^3/h	15900	18500	24000	25000	25000
ethylene glycol			%	0	0	0	0	0
MECHANICAL COOLING PERFORMANCE (1)								
Refrigerant						R410A		
total gross cooling capacity			kW	59	63.3	81.5	88.8	99.4
sensible gross cooling capacity			kW	57	63.2	81.1	86.3	91.5
SHR (sensible/total ratio)			–	0.97	1	1	0.97	0.92
compressor power input			kW	6.33+6.32	6.33+6.33	8.27+8.26	9.33+9.3	11.25+11.23
compressor OA			A	12.17+12.17	12.17+12.17	15.14+15.13	17.45+17.41	22.23+22.20
Configuration	**Upflow**	Net Sensible cooling capacity	kW	51.8	60.4	75.6	80.4	85.5
		fan power input	A	2x2.45	3x1.19	3x2.22	3x2.47	3x2.48
		unit power input	kW	17.58	16.26	23.22	26.08	29.93
	Downflow Up	Net Sensible cooling capacity	kW	52.2	59.8	74.5	79.1	84.2
		fan power input	A	2x2.39	3x1.15	3x2.22	3x2.41	3x2.41
		unit power input	kW	17.46	16.14	23.22	25.89	29.74
	Downflow Down	Net Sensible cooling capacity	kW	52.8	60.1	75.2	79.8	84.9
		fan power input	A	2x2.1	3x1.03	3x1.99	3x2.2	3x2.18
		unit power input	kW	16.88	15.78	22.53	25.2	29.05
	Downflow Frontal	Net Sensible cooling capacity	kW	51.1	–	–	–	–
		fan power input	A	2x2.33	–	–	–	–
		unit power input	kW	17.34	–	–	–	–
Condensing section (H models only)								
water inlet temp: 30°C—condensation temp: 45°C								
water flow			l/s	0.695+0.672	0.724+0.681	0.946+0.903	1.044+1.001	1.189+1.158
water side pressure drop			kPa	10+9	5+4	8+8	10+9	12+12
CHILLED WATER PERFORMANCE (1)								
total gross cooling capacity			kW	58.2	76.7	92.1	94.8	94.8
sensible gross cooling capacity			kW	55.4	69	85.8	88.8	88.8
SHR (sensible/total ratio)			–	0.95	0.9	0.93	0.94	0.94
Configuration	**Upflow**	Net Sensible cooling capacity	kW	50.5	65.4	79.1	81.3	81.3
		fan power input	A	2x2.45	3x1.19	3x2.22	3x2.47	3x2.48
		unit power input	kW	4.93	3.6	6.69	7.44	7.44
	Downflow Up	Net Sensible cooling capacity	kW	50.6	65.5	79.1	81.5	81.5
		fan power input	A	2x2.39	3x1.15	3x2.22	3x2.41	3x2.41
		unit power input	kW	4.81	3.48	6.69	7.26	7.26
	Downflow Down	Net Sensible cooling capacity	kW	51.2	65.9	79.8	82.2	82.2
		fan power input	A	2x2.1	3x1.03	3x1.99	3x2.2	3x2.18
		unit power input	kW	4.23	3.12	6	6.57	6.57
	Downflow Frontal	Net Sensible cooling capacity	kW	50.7	–	–	–	–
		fan power input	A	2x2.33	–	–	–	–
		unit power input	kW	4.69	–	–	–	–
mixture flow			l/s	2.78	3.66	4.39	4.52	4.52
unit total pressure drop			kPa	68	54	75	79	79
FAN								
Quantity (Premium Fan Module)			no.	2	3	3	3	3
FLA			A	10	15	15	15	15
LRA			A	0.2	0.3	0.3	0.3	0.3
Quantity (Basic Fan Module, Fix speed)			no.	2	2	2	2	2
FLA			A	10	10	10	10	10
LRA			A	0.2	0.2	0.2	0.2	0.2
COMPRESSOR								
Quantity (Scroll Cooling System)			no.					
FLA			A	2x21	2x21	2x25	2x31	2x34
LRA			A	2x111	2x111	2x118	2x140	2x174
EVAPORATING COIL								
quantity / configuration			no.	1	1	1	1	1
pipes/fins						Copper/treated aluminum		
pitch fins			mm	1.8	1.8	1.8	1.8	1.8
rows			no.	2+3	2+3	2+3	2+3	
front surface			m^2	1.482	2.442	2.442	2.442	2.442
CHILLED WATER COIL								
quantity / configuration			no.	1	1	1	1	1
pipes/fins						Copper/treated aluminum		
pitch fins			mm	1.6	1.6	1.6	1.6	1.6
rows			no.	5	5	5	5	5
front surface			m^2	1.482	2.442	2.442	2.442	2.442
REFRIGERANT CONNECTIONS (D models only)				**Refrigerant connecting pipe diameter: see Tab. 12f, Chap. 12**				
gas line outlet (pipe to be welded, o.d.)			mm	18/18	18/18	18/18	18/18	18/18
liquid line inlet (pipe to be welded, o.d.)			mm	18/18	18/18	22/22	22/22	22/22

Technical Data

MODELS		PX062	PX068	PX082	PX094	PX104
WATER CIRCUIT CONDENSER (H models only)						
condenser type				Brazed plate		
water connections ISO 7/1	inch	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼
Total water internal volume	l	6.46	8.68	8.68	8.68	8.68
CHILLED WATER CONTENT ISO 7/1	inch	Rp 1 ½		O. D. 54 mm* R 2**		
Total water internal volume	l	25.9	42.6	42.6	42.6	42.6
DIMENSIONS						
width	mm	1750	2550	2550	2550	2550
depth	mm	890	890	890	890	890
height	mm	1970	1970	1970	1970	1970
footprint	m^2	1.5575	2.2695	2.2695	2.2695	2.2695

Data refers to Standard Units without options, Premium Fan Module with clean F5 filters.
Standard ESP: Upflow 50Pa; Downflow Up 20Pa; Downflow Down 20 Pa Downflow Frontal 0Pa
For Downflow Up and Down versions the data refers to the height of the raised floor = 600mm
Performance data refers to Downflow Units, if not specified otherwise.

(1) IN THE FOLLOWING STANDARD CONDITIONS: Room conditions 24°C bs; 50% R.H. (17°C wb) – Condensing temperature: 45°C – CW mode water temperature inlet/outlet 7/12 °C – Air flow of the units refers to the standard configuration with F5 class filter.

(2) Liebert PDX is able to adapt to the different site needs and working conditions. Performances in different working conditions, different airflows can be provided by Emerson Network Power representatives.

Technical data can be subject to change without notice.
** VICTAULIC® Connection.*
*** Optional. Threaded union on request*

Technical Data

Tab. 4f — Digital Scroll Cooling System dualfluid direct expansion unit @ 100% cooling capacity, Premium Fan Module

PXxxx D/H series

MODELS				PX041	PX047	PX051	PX044	PX054
Power supply voltage			V/Ph/Hz	400V ±10% / 3Ph / 50Hz				
Refrigerant circuit				single	single	single	double	double
PERFORMANCE LEGACY (1)(3)						**Air Condition: 24°C, R.H. 50%**		
air flow			m^3/h	10000	13200	15200	12500	15300
ethylene glycol			%	0	0	0	0	0
MECHANICAL COOLING PERFORMANCE (1)								
Refrigerant						R410A		
total gross cooling capacity			kW	38	47	50.9	42.6	52.2
sensible gross cooling capacity			kW	36.2	46.6	50.9	42.6	52.1
SHR (sensible/total ratio)			–	0.95	0.99	1	1	1
compressor power input			kW	8.47	10.65	11.22	4.76+4.55	5.69+5.53
compressor OA			A	15.59	14.93	21.83	8.38+8.15	11.01+10.81
Configuration	**Upflow**	Net Sensible cooling capacity	kW	34.7	44.2	47	39.8	47.7
		fan power input	A	2.47	2x1.35	2x1.91	2x1.37	2x2.25
		unit power input	kW	10.97	13.38	15.07	12.07	15.75
	Downflow Up	Net Sensible cooling capacity	kW	33.7	44	47.2	39.9	47.7
		fan power input	A	2.47	2x1.3	2x1.85	2x1.33	2x2.19
		unit power input	kW	10.97	13.28	14.95	12	15.63
	Downflow Down	Net Sensible cooling capacity	kW	34	44.3	47.6	40.2	48.3
		fan power input	A	2.22	2x1.13	2x1.64	2x1.16	2x1.91
		unit power input	kW	10.72	12.94	14.53	11.66	15.07
	Downflow Frontal	Net Sensible cooling capacity	kW	33.9	43.2	46.8	39.6	47.4
		fan power input	A	2.34	2x1.21	2x1.75	2x1.24	2x2.08
		unit power input	kW	10.84	13.1	14.75	11.81	15.41
Condensing section								
water inlet temp: 30°C—condensation temp: 45°C								
water flow			l/s	0.873	1104	1197	0.486+0.51	0.595+0.62
water side pressure drop			kPa	10	16	18	10+10	11+12
CHILLED WATER PERFORMANCE (1)								
total gross cooling capacity			kW	37.6	53.9	59.5	49.2	56.7
sensible gross cooling capacity			kW	35.3	48.8	54.9	45.3	53.7
SHR (sensible/total ratio)			–	0.94	0.9	0.92	0.92	0.95
Configuration	**Upflow**	Net Sensible cooling capacity	kW	32.9	46.1	51.1	42.6	49.1
		fan power input	A	2.47	2x1.35	2x1.91	2x1.37	2x2.25
		unit power input	kW	2.5	2.73	3.85	2.77	4.53
	Downflow Up	Net Sensible cooling capacity	kW	32.9	46.2	51.2	42.6	49.3
		fan power input	A	2.47	2x1.3	2x1.85	2x1.33	2x2.19
		unit power input	kW	2.5	2.63	3.73	2.69	4.41
	Downflow Down	Net Sensible cooling capacity	kW	33.1	46.5	51.6	43	49.8
		fan power input	A	2.22	2x1.13	2x1.64	2x1.16	2x1.91
		unit power input	kW	2.25	2.29	3.31	2.35	3.85
	Downflow Frontal	Net Sensible cooling capacity	kW	33	46.4	51.4	42.8	49.5
		fan power input	A	2.34	2x1.21	2x1.75	2x1.24	2x2.08
		unit power input	kW	2.37	2.45	3.53	2.51	4.19
mixture flow			l/s	1.79	2.57	2.84	2.35	2.7
unit total pressure drop			kPa	100	71	85	50	65
PERFORMANCE SMART (2)(3)						**Air Condition: 35°C, R.H. 30%**		
air flow(4)			m^3/h	10000	13200	15200	12500	15300
ethylene glycol			%	0	0	0	0	0
MECHANICAL COOLING PERFORMANCE (2)								
Refrigerant						R410A		
total gross cooling capacity			kW	46.2	58.1	63.2	53.5	65.3
sensible gross cooling capacity			kW	46.2	58.1	63.2	53.5	65.2
SHR (sensible/total ratio)			–	1	1	1	1	1
compressor power input			kW	8.52	10.71	11.13	4.84+4.56	5.64+5.47
compressor OA			A	15.63	15.04	21.58	8.41+8.2	10.86+10.68
Configuration	**Upflow**	Net Sensible cooling capacity	kW	44.3	55.4	59.3	50.6	60.6
		fan power input	A	2.47	2x1.35	2x1.91	2x1.37	2x2.25
		unit power input	kW	11.03	13.45	14.98	12.16	15.64
	Downflow Up	Net Sensible cooling capacity	kW	43.7	55.5	59.5	50.8	60.8
		fan power input	A	2.47	2x1.3	2x1.85	2x1.33	2x2.19
		unit power input	kW	11.02	13.34	14.86	12.09	15.52
	Downflow Down	Net Sensible cooling capacity	kW	44	55.8	59.9	51.1	61.4
		fan power input	A	2.22	2x1.13	2x1.62	2x1.16	2x1.91
		unit power input	kW	10.77	13	14.4	11.75	14.96
	Downflow Frontal	Net Sensible cooling capacity	kW	43.9	54.8	58.6	50.3	60.1
		fan power input	A	2.34	2x1.21	2x1.8	2x1.24	2x2.08
		unit power input	kW	10.89	13.15	14.77	11.9	15.31

Technical Data

MODELS				PX041	PX047	PX051	PX044	PX054
Condensing section								
water inlet temp: 30°C—condensation temp: 45°C								
water flow			l/s	1043	1339	1457	0.587+0.64	0.716+0.77
water side pressure drop			kPa	14	23	27	14+16	15+17
CHILLED WATER PERFORMANCE (2)								
total gross cooling capacity			kW	39.5	55.4	61.7	51.5	60
sensible gross cooling capacity			kW	39.5	55.4	61.7	51.5	60
SHR (sensible/total ratio)			–	1	1	1	1	1
Configuration	**Upflow**	Net Sensible cooling capacity	kW	37	52.7	57.9	48.8	55.5
		fan power input	A	2.47	2x1.35	2x1.91	2x1.37	2x2.25
		unit power input	kW	2.5	2.73	3.85	2.77	4.53
	Downflow Up	Net Sensible cooling capacity	kW	37	52.8	58	48.8	55.6
		fan power input	A	2.47	2x1.3	2x1.85	2x1.33	2x2.19
		unit power input	kW	2.5	2.63	3.73	2.69	4.41
	Downflow Down	Net Sensible cooling capacity	kW	37.3	53.2	58.4	49.2	56.2
		fan power input	A	2.22	2x1.13	2x1.64	2x1.16	2x1.91
		unit power input	kW	2.25	2.29	3.31	2.35	3.85
	Downflow Frontal	Net Sensible cooling capacity	kW	37.1	53	58.1	49	55.8
		fan power input	A	2.34	2x1.21	2x1.8	2x1.24	2x2.08
		unit power input	kW	2.37	2.45	3.63	2.51	4.19
mixture flow			l/s	1.58	2.21	2.46	2.05	2.39
unit total pressure drop			kPa	76	52	63	38	50
FAN								
Quantity (Premium Fan Module)			no.	1	2	2	2	2
FLA			A	5	10	10	10	10
LRA			A	0.1	0.2	0.2	0.2	0.2
Quantity (Basic Fan Module, Fix speed)			no.	1	1	1	1	1
FLA			A	5	5	5	5	5
LRA			A	0.1	0.1	0.1	0.1	0.1
COMPRESSOR								
Quantity (Digital Scroll Cooling System)			no.	1	2	2	2	2
FLA			A	25	16.5+15	2x16.2	2x15	2x16.2
LRA			A	118	2x101	2x101	2x75	2x101
EVAPORATING COIL								
quantity / configuration			no.	1	1	1	1	1
pipes/fins					Copper/treated aluminum			
pitch fins			mm	1.8	1.8	1.8	1.8	1.8
rows			no.	5	4	4	2+2	2+2
front surface			m^2	0.978	1.626	1.626	1.482	1.482
CHILLED WATER COIL								
quantity / configuration			no.	1	1	1	1	1
pipes/fins					Copper/treated aluminum			
pitch fins			mm	1.6	1.6	1.6	1.6	1.6
rows			no.	5	5	5	5	5
front surface			m^2	0.978	1.626	1.626	1.482	1.482
REFRIGERANT CONNECTIONS (D models only)				**Refrigerant connecting pipe diameter: see Tab. 12f, Chap. 12**				
gas line outlet (pipe to be welded, o.d.)			mm	22	22	22	18/18	18/18
liquid line inlet (pipe to be welded, o.d.)			mm	18	18	18	18/18	18/18
WATER CIRCUIT CONDENSER (H models only)								
condenser type						Brazed plate		
water connections ISO 7/1			inch	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼
Total water internal volume			l	4.14	4.14	4.14	5.12	5.8
CHILLED WATER CONTENT ISO 7/1			inch	Rp 1 ¼	Rp 1 ½	Rp 1 ½	Rp 1 ½	Rp 1 ½
Total water internal volume			l	17.6	27.9	27.9	25.9	25.9
DIMENSIONS								
width			mm	1200	1750	1750	1750	1750
depth			mm	890	890	890	890	890
height			mm	1970	1970	1970	1970	1970
footprint			m^2	1.068	1.5575	1.5575	1.5575	1.5575

Data refers to Standard Units without options, Premium Fan Module with clean F5 filters.
Standard ESP: Upflow 50Pa; Downflow Up 20Pa; Downflow Down 20 Pa Downflow Frontal 0Pa
For Downflow Up and Down versions the data refers to the height of the raised floor = 600mm
Performance data refers to Downflow Units, if not specified otherwise.

(1) IN THE FOLLOWING STANDARD CONDITIONS: Room conditions 24°C bs; 50% R.H. (17°C wb) – Condensing temperature: 45°C – CW mode water temperature inlet/outlet 7/12 °C – Air flow of the units refers to the standard configuration with F5 class filter.

(2) IN THE FOLLOWING STANDARD CONDITIONS: Room conditions 35°C bs; 30% R.H. (21.4°C wb) – Condensing temperature: 45°C – CW mode water temperature inlet/outlet 12/18 °C – Air flow of the units refers to the standard configuration with F5 class filter.

(3) Liebert PDX is able to adapt to the different site needs and working conditions. Performances in different working conditions, different airflows can be provided by Emerson Network Power representatives.

(4) The Airflow indicated in the Smart Performance is the unit nominal airflow.

Technical data can be subject to change without notice.
** VICTAULIC® Connection.*
*** Optional. Threaded union on request*

Technical Data

MODELS				PX062	PX068	PX082	PX094	PX104
Power supply voltage			V/Ph/Hz	400V ±10% / 3Ph / 50Hz				
Refrigerant circuit				double	double	double	double	double
PERFORMANCE LEGACY (1)(3)						**Air Condition: 24°C, R.H. 50%**		
air flow			m^3/h	15900	18500	24000	25000	25000
ethylene glycol			%	0	0	0	0	0
MECHANICAL COOLING PERFORMANCE (1)								
Refrigerant						R410A		
total gross cooling capacity			kW	58.7	63	81.9	92	97.1
sensible gross cooling capacity			kW	56.8	63	81.3	87.9	90.4
SHR (sensible/total ratio)			–	0.97	1	0.99	0.96	0.93
compressor power input			kW	6.42+6.33	6.45+6.33	9.29+9.31	10.64+10.65	11.22+11.22
compressor OA			A	12.62+12.17	12.66+12.17	16.5+16.52	14.9+14.93	21.85+21.84
Configuration	**Upflow**	Net Sensible cooling capacity	kW	51.6	60	76	81.8	84.4
		fan power input	A	2x2.45	3x1.19	3x2.22	3x2.47	3x2.47
		unit power input	kW	17.67	16.38	25.3	28.74	29.88
	Downflow Up	Net Sensible cooling capacity	kW	52	59.5	74.7	80.7	83.1
		fan power input	A	2x2.39	3x1.15	3x2.22	3x2.41	3x2.41
		unit power input	kW	17.56	16.26	25.29	28.55	29.7
	Downflow Down	Net Sensible cooling capacity	kW	52.6	59.9	75.4	81.3	83.8
		fan power input	A	2x2.10	3x1.03	3x1.99	3x2.2	2x2.18
		unit power input	kW	16.98	15.9	24.6	27.92	29.01
	Downflow Frontal	Net Sensible cooling capacity	kW	51	–	–	–	–
		fan power input	A	2x2.33	–	–	–	–
		unit power input	kW	17.43	–	–	–	–
Condensing section								
water inlet temp: 30°C—condensation temp: 45°C								
water flow			l/s	0.667+0.7	0.677+0.72	0.929+0.97	1.061+1.10	1.132+1.17
water side pressure drop			kPa	10+11	6+8	11+13	15+16	16+18
CHILLED WATER PERFORMANCE (1)								
total gross cooling capacity			kW	58.2	76.7	92.1	94.8	94.8
sensible gross cooling capacity			kW	55.4	69	85.8	88.8	88.8
SHR (sensible/total ratio)			–	0.95	0.9	0.93	0.94	0.94
Configuration	**Upflow**	Net Sensible cooling capacity	kW	50.5	65.4	79.1	81.3	81.3
		fan power input	A	2x2.45	3x1.19	3x2.22	3x2.47	3x2.47
		unit power input	kW	4.93	3.6	6.69	7.44	7.44
	Downflow Up	Net Sensible cooling capacity	kW	50.6	65.5	79.1	81.5	81.5
		fan power input	A	2x2.39	3x1.15	3x2.22	3x2.41	3x2.41
		unit power input	kW	4.81	3.48	6.69	7.26	7.26
	Downflow Down	Net Sensible cooling capacity	kW	51.2	65.9	79.8	82.2	82.2
		fan power input	A	2x2.10	3x1.03	3x1.99	3x2.18	3x2.18
		unit power input	kW	4.23	3.12	6	6.57	6.57
	Downflow Frontal	Net Sensible cooling capacity	kW	50.7	–	–	–	–
		fan power input	A	2x2.33	–	–	–	–
		unit power input	kW	4.69	–	–	–	–
mixture flow			l/s	2.78	3.66	4.39	4.52	4.52
unit total pressure drop			kPa	68	54	75	79	79
PERFORMANCE SMART (2)(3)						**Air Condition: 35°C, R.H. 30%**		
air flow(4)			m^3/h	15900	18500	24000	25000	25000
ethylene glycol			%	0	0	0	0	0
MECHANICAL COOLING PERFORMANCE (2)								
Refrigerant						R410A		
total gross cooling capacity			kW	72.4	79	101.9	113.5	118.6
sensible gross cooling capacity			kW	72.4	79	101.9	113.4	118.6
SHR (sensible/total ratio)			–	1	1	1	1	1
compressor power input			kW	6.54+6.33	6.62+6.33	9.38+9.42	10.69+10.71	11.19+11.14
compressor OA			A	12.79+12.17	12.92+12.17	16.58+16.6	15.01+15.05	21.75+21.61
Configuration	**Upflow**	Net Sensible cooling capacity	kW	67.3	76.2	96.5	107.6	112.8
		fan power input	A	2x2.45	3x1.19	3x2.22	3x2.47	3x2.47
		unit power input	kW	17.77	16.55	25.49	28.84	29.76
	Downflow Up	Net Sensible cooling capacity	kW	67.7	75.5	95.4	106.2	111.3
		fan power input	A	2x2.39	3x1.15	3x2.16	3x2.41	3x2.41
		unit power input	kW	17.68	16.43	25.31	28.66	29.59
	Downflow Down	Net Sensible cooling capacity	kW	68.2	75.9	95.9	106.9	112
		fan power input	A	2x2.10	3x1.03	3x1.99	3x2.18	3x2.18
		unit power input	kW	17.1	16.07	24.8	27.97	28.9
	Downflow Frontal	Net Sensible cooling capacity	kW	66.5	–	–	–	–
		fan power input	A	2x2.33	–	–	–	–
		unit power input	kW	17.54	–	–	–	–
Condensing section (H models only)								
water inlet temp: 30°C—condensation temp: 45°C								
water flow			l/s	0.79+0.86	0.818+0.91	1.110+1.21	1.251+1.37	1.312+1.44
water side pressure drop			kPa	14+17	9+11	16+19	20+24	22+26

Technical Data

MODELS				PX062	PX068	PX082	PX094	PX104
CHILLED WATER PERFORMANCE (2)								
total gross cooling capacity			kW	61.8	78.8	96	99	99
sensible gross cooling capacity			kW	61.8	78.8	96	99	99
SHR (sensible/total ratio)			–	1	1	1	1	1
Configuration	**Upflow**	Net Sensible cooling capacity	kW	56.8	75.2	89.4	91.6	91.6
		fan power input	A	2x2.45	3x1.19	3x2.22	3x2.47	2.47
		unit power input	kW	4.93	3.6	6.69	7.44	7.44
	Downflow Up	Net Sensible cooling capacity	kW	57	75.3	89.6	91.8	91.8
		fan power input	A	2x2.39	3x1.15	3x2.16	3x2.41	2x2.41
		unit power input	kW	4.81	3.48	6.51	7.26	7.26
	Downflow Down	Net Sensible cooling capacity	kW	57.9	75.7	90.1	92.5	92.5
		fan power input	A	2x2.10	3x1.03	3x1.99	3x2.18	3x2.18
		unit power input	kW	4.23	3.12	6	6.57	6.57
	Downflow Frontal	Net Sensible cooling capacity	kW	57.1	–	–	–	–
		fan power input	A	2x2.33	–	–	–	–
		unit power input	kW	4.69	–	–	–	–
mixture flow			l/s	2.46	3.14	3.83	3.95	3.95
unit total pressure drop			kPa	53	39	56	60	60
FAN								
Quantity (Premium Fan Module)			no.	2	3	3	3	3
FLA			A	10	15	15	15	15
LRA			A	0.2	0.3	0.3	0.3	0.3
Quantity (Basic Fan Module, Fix speed)			no.	2	2	2	2	2
FLA			A	10	10	10	10	10
LRA			A	0.2	0.2	0.2	0.2	0.2
COMPRESSOR								
Quantity (Digital Scroll Cooling System)			no.	2	2	4	4	4
FLA			A	2x21	2x21	4x15	2x(16.5+15)	4x16.2
LRA			A	2x111	2x111	4x75	4x101	4x101
EVAPORATING COIL								
quantity / configuration			no.	1	1	1	1	1
pipes/fins					Copper/treated aluminum			
pitch fins			mm	1.8	1.8	1.8	1.8	1.8
rows			no.	2+2	2+2	2+2	2+2	2+2
front surface			m^2	1.482	2.442	2.442	2.442	2.442
CHILLED WATER COIL								
quantity / configuration			no.	1	1	1	1	1
pipes/fins					Copper/treated aluminum			
pitch fins			mm	1.6	1.6	1.6	1.6	1.6
rows			no.	5	5	5	5	5
front surface			m^2	1.482	2.442	2.442	2.442	2.442
REFRIGERANT CONNECTIONS (D models only)				**Refrigerant connecting pipe diameter: see Tab. 12f, Chap. 12**				
gas line outlet (pipe to be welded, o.d.)			mm	18/18	18/18	22/22	22/22	22/22
liquid line inlet (pipe to be welded, o.d.)			mm	18/18	18/18	18/18	18/18	18/18
WATER CIRCUIT CONDENSER (H models only)								
condenser type						Brazed plate		
water connections ISO 7/1			inch	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼	Rp 1 ¼
Total water internal volume			l	6.46	8.68	8.68	8.68	8.68
CHILLED WATER CONTENT ISO 7/1			inch	Rp 1 ½		O. D. 54 mm* R 2**		
Total water internal volume			l	25.9	42.6	42.6	42.6	42.6
DIMENSIONS								
width			mm	1750	2550	2550	2550	2550
depth			mm	890	890	890	890	890
height			mm	1970	1970	1970	1970	1970
footprint			m^2	1.5575	2.2695	2.2695	2.2695	2.2695

Data refers to Standard Units without options, Premium Fan Module with clean F5 filters.
Standard ESP: Upflow 50Pa; Downflow Up 20Pa; Downflow Down 20 Pa Downflow Frontal 0Pa
For Downflow Up and Down versions the data refers to the height of the raised floor = 600mm
Performance data refers to Downflow Units, if not specified otherwise.

(1) IN THE FOLLOWING STANDARD CONDITIONS: Room conditions 24°C bs; 50% R.H. (17°C wb) – Condensing temperature: 45°C – CW mode water temperature inlet/outlet 7/12 °C – Air flow of the units refers to the standard configuration with F5 class filter.

(2) IN THE FOLLOWING STANDARD CONDITIONS: Room conditions 35°C bs; 30% R.H. (21.4°C wb) – Condensing temperature: 45°C – CW mode water temperature inlet/outlet 12/18 °C – Air flow of the units refers to the standard configuration with F5 class filter.

(3) Liebert PDX is able to adapt to the different site needs and working conditions. Performances in different working conditions, different airflows can be provided by Emerson Network Power representatives.

(4) The Airflow indicated in the Smart Performance is the unit nominal airflow.

Technical data can be subject to change without notice.
** VICTAULIC® Connection.*
*** Optional. Threaded union on request*

5 Heat Rejections (A — D versions)

Coupling of room units with remote air—cooled condensers

The units should be connected to Liebert HCR or Liebert® MC™ Microchannel Coil Condenser.
The following paragraphs describe the suggested coupling of **Liebert® PDX** units. The data given below are approximate and must always be verified on the basis of the other specific operating conditions.
Liebert® PDX units, Dual Circuit Scroll Cooling System, can be connected to Liebert HCR (single circuit), Liebert® HBR (dual circuit) or Liebert® MC™ Microchannel Coil Condenser single or dual circuit. Liebert® PDX units, Dual Circuit Digital Scroll Cooling System, can be connected to Liebert HCR (single circuit) or Liebert® MC™ Microchannel Coil Condenser single or dual circuit.
To ensure correct operation, best performance, and longest life the units must be connected to remote condensers approved by Emerson Network Power.
The warranty clauses are no longer valid if the unit is connected to an unapproved remote condenser.
Connecting a too large capacity condenser (50% higher than the nominal capacity indicated in Tab.5.a) to the PDX unit can cause malfunctioning and incorrect condenser regulation at low ambient temperature (e.g. in cold season).
All HCR condensers (refrigerant R410A) with Variex have the possibility to change the condenser set point from default set point 1 (condensing temperature 39°C) to set point 2 (condensing temperature 34°C). This set point 2 increases the system efficiency despite of a little increase of the external unit noise. For more details see the HCR manuals.

Note: This option is possible only when indoor units have the EEV (electronic expansion valve).

Tab. 5a — Coupling of Liebert HCR Condensers with Liebert® PDX A—D

MODEL	External temperature up to 35°C	External temperature up to 40°C	External temperature up to 46°C	External temperature up to 48°C
PX041xA/D	1 x HCR51	1 x HCR59	1 x HCR76	1 x HCR88
PX045xA	1 x HCR59	1 x HCR59	1 x HCR76	1 x HCR88
PX047xA/D	1 x HCR59	1 x HCR59	1 x HCR76	1 x HCR88
PX051xA/D	1 x HCR59	1 x HCR76	1 x HCR88	1 x HCR99
PX057xA	1 x HCR76	1 x HCR88	1 x HCR88	1 x HCR99
PX044xA/D	2 x HCR33	2 x HCR33	2 x HCR43	2 x HCR51
PX054xA/D	1 x HCR33	2 x HCR43	2 x HCR43	2 x HCR59
PX062xA/D	2 x HCR43	2 x HCR43	2 x HCR59	2 x HCR76
PX074xA	2 x HCR43	2 x HCR59	2 x HCR76	1 x HCR88
PX068xA/D	2 x HCR43	2 x HCR43	2 x HCR59	2 x HCR76
PX082xA/D	2 x HCR51	2 x HCR59	2 x HCR76	1 x HCR88
PX094xA/D	2 x HCR59	2 x HCR76	2 x HCR88	2 x HCR99
PX104xA/D	2 x HCR59	2 x HCR76	2 x HCR88	2 x HCR99
PX120xA	2 x HCR76	2 x HCR88	2 x HCR99	2 x HCR99
PX059xA	2 x HCR76	1 x HCR88	1 x HCR88	1 x HCR99
PX092xA	2 x HCR59	2 x HCR76	1 x HCR88	2 x HCR99

Tab. 5b — Coupling of Liebert® MC Condensers with Liebert® PDX A—D

MODEL	External temperature up to 35°C	External temperature up to 40°C	External temperature up to 46°C
PX041xA/D	1 x MCL055	1 x MCL055	1 x MCM080
PX045xA	1 x MCL055	1 x MCM080	1 x MCM080
PX047xA/D	1 x MCL055	1 x MCM080	1 x MCM080
PX051xA/D	1 x MCM080	1 x MCM080	1 x MCL110
PX057xA	1 x MCM080	1 x MCM080	1 x MCL110
PX044xA/D	2 x MCS028	2 x MCM040	2 x MCM040
PX054xA/D	2 x MCM040	2 x MCM040	2 x MCL055
PX062xA/D	2 x MCM040	2 x MCL055	2 x MCL055
PX074xA	2 x MCL055	2 x MCL055	2 x MCM080
PX068xA/D	2 x MCM040	2 x MCL055	2 x MCL055
PX082xA/D	2 x MCL055	2 x MCL055	2 x MCM080
PX094xA/D	2 x MCL055	2 x MCM080	2 x MCM080
PX104xA/D	2 x MCM080	2 x MCM080	2 x MCL110
PX120xA	2 x MCM080	2 x MCL110	2 x MCL110
PX059xA	1 x MCM080	1 x MCM080	2 x MCL110
PX092xA	2 x MCL055	2 x MCM080	2 x MCM080

Heat Rejections (A — D versions)

Tab. 5c — Technical data and performance of Liebert HCR condenser

Model	Power supply [V/Ph/Hz]	Total Heat Rejection (THR)* R410A [kW]	Air Volume [m^3/h]	Noise Level ** [dB(A)] @ 5 m	Input Power [kW]	Current Absorption [A]	FLA [A]	Refrigerant connections [mm]		Unit with packing	
								Gas line [mm]	Liquid line [mm]	Dimensions [mm]	Weight [kg]
HCR 24	230/1/50	24,0	8.600	51,0	0,55	2,5	2,5	16	16	L 1112 W 1340 H 907	60
HCR 33	230/1/50	32,2	7.400	51,0	0,55	2,5	2,5	16	16	L 1112 W 1340 H 907	75
HCR 43	230/1/50	46,0	17.000	54,0	1,10	5,0	5,0	16	16	L 1112 W 2340 H 907	92
HCR 51	230/1/50	52,0	17.000	54,0	1,10	5,0	5,0	22	16	L 1112 W 2340 H 907	93
HCR 59	230/1/50	62,0	15.600	54,0	1,10	5,0	5,0	22	16	L 1112 W 2340 H 907	102
HCR 76	230/1/50	78,0	25.500	56,0	1,65	7,5	7,5	22	16	L 1112 W 3340 H 907	136
HCR 88	230/1/50	92,0	23.400	56,0	1,65	7,5	7,5	22	16	L 1112 W 3340 H 907	165
HCR 99	230/1/50	130,0	32.000	57,0	2,20	10,0	10,0	28	22	L 1112 W 4338 H 907	220

Tab. 5d — Technical data and performance of Liebert® MC Condenser

Model	Power supply [V/Ph/Hz]	Total Heat Rejection (THR)* R410A [kW]	Air Volume [m^3/h]	Noise Level ** [dB(A)] @ 5 m	Input Power [kW]	Current Absorption [A]	FLA [A]	Refrigerant connections [mm]		Unit with packing	
								Gas line [mm]	Liquid line [mm]	Dimensions [mm]	Weight [kg]
MCS028	230/1/50	32.96	8831	49.8	0.473	0.99	4.3	22	16	L 1400 W 1100 H 1000	70
MCM040	400/3/50	41.97	11264	54	0.636	1.23	1.5	22	16	L 1453 W 1175 H 1007	105
MCL055	400/3/50	59.55	15451	62	0.92	1.72	3.5	28	22	L 1730 W 1420 H 1100	156
MCM080	400/3/50	83.94	22528	57	1.272	2.46	3	28	22	L 2674 W 1175 H 1007	200
MCL110	400/3/50	112	30902	65	2.11	3.96	7	35	28	L 3160 W 1420 H 1100	273

(*) The nominal capacities refer to the following operative conditions:

- refrigerant as indicated (R410A).
- temperature differences: 15 K (T condensation – T outdoor).
- height of the installation = 0 m, above the sea level. For different altitudes, see Hirating program.
- clean exchange surfaces.

(**) The levels of sound pressure here included are measured in the same operative conditions, and are referred to 5 m far from the unit, at 1.5 m in height in free field conditions.

Coupling of water cooled units with remote Dry Coolers

The water—condensed units are provided with a water/refrigerant exchanger with braze—welded **plates** made of **stainless steel**; this advanced exchanger type gives the highest efficiency in heat exchange. In addition, a certain oversizing of the exchanger has been provided so as to reduce pressure drops (and energy consumption of the water pump) as much as possible and thus to allow the unit to operate with the external chiller in closed circuit, even at high outdoor temperatures.

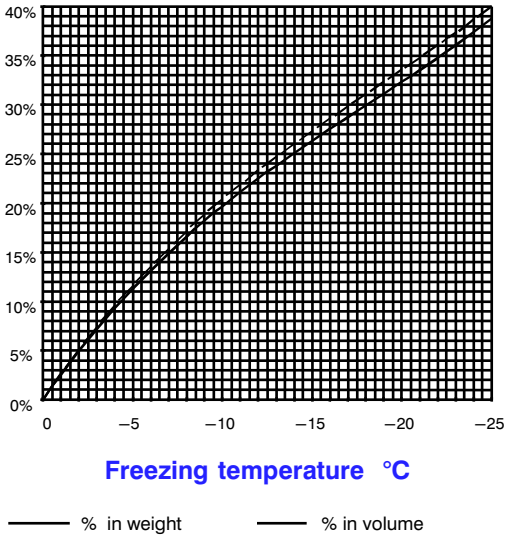
The units type W/H are designed for operating with mains water or water in closed circuit with an external chiller. The units type F are designed for operating with water in closed circuit with a remote Dry Cooler (or other suitable external device).
When operating in a closed circuit, the water is cooled by the outdoor air in a heat exchanger; in this case, to avoid unwanted ice formation during winter, it is advisable to use a water/glycol mixture.

The circulation of the water—glycol mixture is forced (the pump is not supplied). If mains water or tower water is used, when installing the unit fit a mechanical filter on the water line to protect the condenser against possible impurities contained in the water (for condenser cleaning see the User Manual).

Dry Coolers

Our Dry Coolers are built with a copper/aluminium cooling coil and axial fan(s).
The main data on Dry Coolers is shown in the following table:

Percentage of ethylene glycol mixed with water



Note:
In the closed circuits to avoid water freezing in the cold seasons, it is strictly recommended to mix water with ethylene glycol. The suggested percentage is given in the Diagram.
For safety reason, **calculate the percentage** at least at 5°C below the minimum ambient temperature.

It is also recommended to check periodically the mixture: in case of leackage of the circuit, the sanitary water, used at compensation, reduces progressively the glycol percentage and increases the freezing point of the mixture!

Features and benefits

Liebert HPD Dry Coolers are the new range of liquid coolers, able to cover rated heat exchange capacities from 8 to 400 kW.

They excel above all for their efficiency, versatility and reliability, thanks to the following features:

- possibility of installation with horizontal or vertical air flow with simple operations on site, with the same model of Dry Cooler, without needing any wiring or re—wiring inside the unit.
- modulating fan speed regulator with phase (optional), for a continuous modulation of the fan speed, installed on the machine, wired and factory—set, thus making the connection steps on site and the unit start—up extremely easy; the fan speed regulator with phase cutoff can be selected to control up to two set—point values for the water delivery temperature of the Dry Cooler.
  Do not use fan speed regulator other than the approved one supplied by the manufacturer.
  When the Dry Cooler is ordered without temperature control, an outer on/off type control (to be arranged by the customer) is anyway allowed and must be connected on site with the suitable terminals available in the electric board Q of the unit (see wiring diagram enclosed to the unit).

Heat Rejections (W — F — H versions)

- The axial fans are equipped with protection grid and are statically and dynamically balanced; they can guarantee high efficiency and a low emitted noise level (above all in the low noise version); further, they are equipped with motors able to operate within a wide range of outdoor working temperatures. Protection degree IP 54. Single—phase fans feature an electric condenser incorporated in the terminal board.
- Heat exchanger with oval—geometry tubes ensuring the best air flow and thus an increase in the efficiency of the heat exchange, for a lower emitted noise level.
  Tubes are in copper and fins in aluminum, with wide heat exchange surface.
  Upon request (optional), the unit can be ordered with fins in epoxy—coated aluminum, with a better protection. The coil manifolds are in copper, with flanged connections in AISI 304 stainless steel for the models with three—phase power supply and male gas threaded connections for the single—phase models.
- the power supply is:

  230 V single phase 50 Hz in the ESM models (standard noise level) and ELM models (low noise level).

  400 V three—phase 50 Hz in the EST models (standard noise level) and ELT models (low noise level).
- Electrical boxes and accessories are water proof IP55.
- The frame is made up of a sturdy structure in galvanized steel, totally painted.
- The units are equipped with protection electric board Q, with main disconnector and safety device for fan motors.
- The most important technical data are gathered in Tab. 5f.
  Tests on thermal performance have been carried out at IMQ laboratories, according to the norm UNI EN 1048:2000, at the following special operating conditions:

  Air inlet T = 35°C

  Water inlet T = 45°C

  Water outlet T = 40°C
  Sound pressure levels have been evaluated according to the norm EN13487, at a 10—m distance, with free field.
- The working pressure depends on the circuit where the Dry Cooler is connected. Dry Cooler max working pressure = **16** bar.

All Dry Coolers are CE marking.

Dry Cooler units are conform to the following directives:

- 2006/42/EC;
- 2004/108/EC;
- 2006/95/EC;
- 97/23/EC.

Tab. 5e — Coupling of Dry Coolers

Model	External temperature up to 30°C		External temperature up to 35°C		External temperature up to 40°C	
	Standard	Low noise	Standard	Low noise	Standard	Low noise
PX041xW/F/H	1 x EST028	1 x ELM027	1 x EST040	1 x ELT040	1 x EST060	1 x ELT055
PX045xW	1 x EST028	1 x ELM027	1 x EST040	1 x ELT040	1 x EST060	1 x ELT065
PX047xW/F/H	1 x EST028	1 x ELM027	1 x EST040	1 x ELT047	1 x EST060	1 x ELT065
PX051xW/F/H	1 x EST040	1 x ELT040	1 x EST050	1 x ELT047	1 x EST080	1 x ELT085
PX057xW	1 x EST040	1 x ELT040	1 x EST060	1 x ELT055	1 x EST080	1 x ELT085
PX044xW/F/H	1 x EST028	1 x ELM027	1 x EST040	1 x ELT040	1 x EST060	1 x ELT065
PX054xW/F/H	1 x EST040	1 x ELT040	1 x EST050	1 x ELT047	1 x EST080	1 x ELT085
PX062xW/F/H	1 x EST050	1 x ELT047	1 x EST060	1 x ELT055	1 x EST080	1 x ELT085
PX074xW	1 x EST050	1 x ELT047	1 x EST060	1 x ELT065	1 x EST125	1 x ELT130
PX068xW/F/H	1 x EST050	1 x ELT047	1 x EST060	1 x ELT055	1 x EST080	1 x ELT100
PX082xW/F/H	1 x EST060	1 x ELT055	1 x EST070	1 x ELT065	1 x EST125	1 x ELT130
PX094xW/F/H	1 x EST060	1 x ELT055	1 x EST080	1 x ELT085	1 x EST125	1 x ELT130
PX104xW/F/H	1 x EST070	1 x ELT065	1 x EST080	1 x ELT100	1 x EST175	1 x ELT160
PX120xW	1 x EST080	1 x ELT085	1 x EST125	1 x ELT100	1 x EST220	1 x ELT210
PX059xW	1 x EST040	1 x ELT040	1 x EST050	1 x ELT055	1 x EST080	1 x ELT085
PX092xW	1 x EST060	1 x ELT065	1 x EST080	1 x ELT085	1 x EST125	1 x ELT130

The table shows the recommended combinations of the Dry Coolers Liebert HPD with the air conditioners Liebert® PDX, according to the external air temperature.
The combinations have been evaluated considering a mixture of water and ethylene glycol up to 30% as thermal exchange fluid.
The above indications are approximate and must be checked on the basis of other specific operating conditions.
For operating conditions other than those indicated in the table, refer to the New Hirating calculation software and to the Dry Coolers User Manual.

Heat Rejections (W — F — H versions)

Tab. 5f — Technical data and performance of Dry Coolers

	Performances			Electric data			Overall dimensions		
Standard Model	**Duty *(a)***	**Air flow**	**Noise level *(c)***	**Supply**	**Number of fans**	**Total absorbed power**	**Width**	**Depth**	**Height *(b)***
	kW	**m³/h**	**db(A)**	**V/ph/Hz**	**n°**	**kW**	**mm**	**mm**	**mm**
ESM009	10.8	7100	46	230/1/50	1	0.78	1336	820	1030
ESM013	12.8	6700	46	230/1/50	1	0.78	1336	820	1030
ESM018	16.1	15000	49	230/1/50	2	1.56	2236	820	1030
ESM022	22.0	14200	49	230/1/50	2	1.56	2236	820	1030
EST028	28.0	20000	49	400/3/50	2	1.38	2866	1250	1070
EST040	36.4	19400	49	400/3/50	2	1.38	2866	1250	1070
EST050	46.1	18400	49	400/3/50	2	1.38	2866	1250	1070
EST060	62.8	28200	51	400/3/50	3	2.07	4066	1250	1070
EST070	69.5	27600	51	400/3/50	3	2.07	4066	1250	1070
EST080	84.8	37600	52	400/3/50	4	2.76	5266	1250	1070
EST125	128.9	63000	50	400/3/50	3	6.00	5276	1620	1650
EST175	168.1	84000	51	400/3/50	4	8.00	6826	1620	1650
EST220	217.6	118800	53	400/3/50	6	12.00	5576	2340	1650
EST270	265.4	109200	53	400/3/50	6	12.00	5576	2340	1650
EST330	327.2	151600	54	400/3/50	8	16.00	7226	2340	1650
EST400	414.1	189500	54	400/3/50	10	20.00	8876	2340	1650

	Performances			Electric data			Overall dimensions		
Low Noise Model	**Duty *(a)***	**Air flow**	**Noise level *(c)***	**Supply**	**Number of fans**	**Total absorbed power**	**Width**	**Depth**	**Height *(b)***
	kW	**m³/h**	**db(A)**	**V/ph/Hz**	**n°**	**kW**	**mm**	**mm**	**mm**
ELM008	6.8	5200	40	230/1/50	1	0.29	1336	820	1030
ELM011	10.3	4700	40	230/1/50	1	0.29	1336	820	1030
ELM015	13.9	10400	43	230/1/50	2	0.58	2236	820	1030
ELM018	17.9	9800	43	230/1/50	2	0.58	2236	820	1030
ELM027	27.0	14700	44	230/1/50	3	0.87	3136	820	1030
ELT040	36.9	15400	43	400/3/50	2	0.96	2866	1250	1070
ELT047	44.5	21000	44	400/3/50	3	0.99	4066	1250	1070
ELT055	55.7	23100	45	400/3/50	3	1.44	4066	1250	1070
ELT065	65.6	32000	46	400/3/50	4	1.92	5266	1250	1070
ELT085	80.8	28800	46	400/3/50	4	1.92	5266	1250	1070
ELT100	96.7	40800	41	400/3/50	3	2.49	5276	1620	1650
ELT130	128.7	62800	44	400/3/50	4	4.92	3926	2340	1650
ELT160	158.2	65200	44	400/3/50	4	4.92	6826	1620	1650
ELT210	212.3	89100	46	400/3/50	6	7.38	5576	2340	1650
ELT270	277.5	118800	47	400/3/50	8	9.84	7226	2340	1650
ELT350	351.0	148500	47	400/3/50	10	12.30	8876	2340	1650

(a): *at the following operative conditions:*
outdoor temperature = 35°C,
inlet/outlet water temperature = 45°C/40°C,
fluid is pure water, slm zero meters.
For different conditions refer to NewHirating program and to the Dry Coolers User Manual.
(b): *vertical flow installation.*
(c): *sound pressure level, free field, at 10 m distance, according to EN13487.*

6 Airflow characteristics

Useful available heads

The tables give the available and allowed external static pressure against airflow at different EC Fan modulation. All units are considered in standard configuration with clean F5 air filters.
The Liebert® PDX units are supplied with electric fans sized for 20 Pa **Available External Static Pressure** (ESP) for the models **Downflow Up** and **Down**, 50 Pa for the models **Upflow** and 0 Pa for **Downflow Frontal**.
The nominal airflow of all units can be changed via iCOM control.

Note: The EC Fan modulation could slightly differ from the EC Fan voltage signal.

Tab. 6a — PXxxx A/W series, basic fan module

MODELS			PX041	PX045	PX047	PX051	PX057	PX044	PX054	PX062
Power supply voltage		V/Ph/Hz				400 ±10% / 3 / 50				
Upflow	Nominal air flow	m^3/h	10000	10500	12200	12200	16300	11900	12400	16300
	ESP @ nominal airflow	Pa	50	50	50	50	50	50	50	50
	EC fan modulation	%	91	95	91	91	89	91	96	93
	Max ESP available@ nominal airflow	Pa	197	135	187	187	226	181	115	155
	EC fan modulation	%	100	100	100	100	100	100	100	100
	Max. airflow (@ 100%, nominal ESP)	m^3/h	11140	11140	13212	13212	18787	12867	12867	17682
Downflow Up	Nominal air flow	m^3/h	10000	10500	12200	12200	16301	11900	12400	16300
	ESP @ nominal airflow	Pa	20	20	20	20	20	20	20	20
	EC fan modulation	%	91	95	90	90	89	90	95	93
	Max ESP available@ nominal airflow	Pa	166	102	170	170	196	167	100	127
	EC fan modulation	%	100	100	100	100	100	100	100	100
	Max. airflow (@ 100%, nominal ESP)	m^3/h	11092	11092	13290	13290	18668	12958	12958	17653
Downflow Down	Nominal air flow	m^3/h	10000	10500	12200	12200	16300	11900	12400	16300
	ESP @ nominal airflow	Pa	20	20	20	20	20	20	20	20
	EC fan modulation	%	87	90	88	88	81	88	92	86
	Max ESP available@ nominal airflow	Pa	238	180	211	211	300	206	142	231
	EC fan modulation	%	100	100	100	100	100	100	100	100
	Max. airflow (@ 100%, nominal ESP)	m^3/h	11749	11749	13626	13626	20573	13276	13276	19309
Downflow Frontal/ Downflow Up Front Air Delivery	Nominal air flow	m^3/h	10000	10500	12200	12200	16300	11900	12400	16300
	ESP @ nominal airflow	Pa	0	0	0	0	0	0	0	0
	EC fan modulation	%	90	94	93	93	87	93	98	92
	Max ESP available@ nominalairflow	Pa	166	102	101	101	197	100	28	128
	EC fan modulation	%	100	100	100	100	100	100	100	100
	Max. airflow (@ 100%, nominal ESP)	m^3/h	11230	11230	12890	12890	18930	12584	12584	17901

MODELS			PX074	PX068	PX082	PX094	PX104	PX120	PX059 EXT	PX092 EXT
Power supply voltage		V/Ph/Hz				400 ±10% / 3 / 50				
Upflow	Nominal air flow	m^3/h	16650	18500	22350	22350	22350	–	10750	17100
	ESP @ nominal airflow	Pa	50	50	50	50	50		50	50
	EC fan modulation	%	95	79	95	95	95	–	89	86
	Max ESP available@ nominal airflow	Pa	129	349	117	117	117	–	232	261
	EC fan modulation	%	100	100	100	100	100	–	100	100
	Max. airflow (@ 100%, nominal ESP)	m^3/h	17682	23285	23285	23285	23285	–	12257	20292
Downflow Up	Nominal air flow	m^3/h	16650	18500	22350	22350	22350	–	10750	17100
	ESP @ nominal airflow	Pa	20	20	20	20	20	–	20	20
	EC fan modulation	%	95	78	94	94	94	–	95	95
	Max ESP available@ nominal airflow	Pa	100	338	102	102	102	–	101	103
	EC fan modulation	%	100	100	100	100	100	–	100	100
	Max. airflow (@ 100%, nominal ESP)	m^3/h	17653	23459	23459	23459	23459	–	11336	18138
Downflow Down	Nominal air flow	m^3/h	16650	18500	22350	22350	22350	–	10750	17100
	ESP @ nominal airflow	Pa	20	20	20	20	20	–	20	20
	EC fan modulation	%	88	75	90	90	90	–	91	88
	Max ESP available@ nominal airflow	Pa	209	390	176	176	176	–	180	205
	EC fan modulation	%	100	100	100	100	100	–	100	100
	Max. airflow (@ 100%, nominal ESP)	m^3/h	19309	24580	24580	24580	24580	–	11994	19689
Downflow Frontal/ Downflow Up Front Air Delivery	Nominal air flow	m^3/h	16650						10750	17100
	ESP @ nominal airflow	Pa	0						0	0
	EC fan modulation	%	94						94	94
	Max ESP available@ nominal airflow	Pa	101						101	103
	EC fan modulation	%	100						100	100
	Max. airflow (@ 100%, nominal ESP)	m^3/h	17901						11475	18379

Airflow characteristics

Tab. 6b — PXxxx A/W series, premium fan module

MODELS			PX041	PX045	PX047	PX051	PX057	PX044	PX054	PX062
Power supply voltage		V/Ph/Hz				400 ±10% / 3 / 50				
Upflow	Nominal air flow	m^3/h	10000	10900	14500	15800	16300	12500	15500	16300
	ESP @ nominal airflow	Pa	50	50	50	50	50	50	50	50
	EC fan modulation	%	86	94	75	81	83	71	84	88
	Max ESP available@ nominal airflow	Pa	252	138	381	311	282	425	262	211
	EC fan modulation	%	100	100	100	100	100	100	100	100
	Max. airflow (@ 100%, nominal ESP)	m^3/h	11518	11518	19671	19671	19671	18505	18505	18505
Downflow Up	Nominal air flow	m^3/h	10000	10900	14500	15800	16300	12500	15500	16300
	ESP @ nominal airflow	Pa	20	20	20	20	20	20	20	20
	EC fan modulation	%	86	94	74	80	82	69	83	87
	Max ESP available@ nominal airflow	Pa	224	319	366	293	263	415	247	194
	EC fan modulation	%	100	100	100	100	100	100	100	100
	Max. airflow (@ 100%, nominal ESP)	m^3/h	11481	11481	19712	19712	19712	18605	18605	18605
Downflow Down	Nominal air flow	m^3/h	10000	10900	14500	15800	16300	12500	15500	16300
	ESP @ nominal airflow	Pa	20	20	20	20	20	20	20	20
	EC fan modulation	%	83	90	70	75	77	65	79	82
	Max ESP available@ nominal airflow	Pa	275	164	423	360	335	458	311	265
	EC fan modulation	%	100	100	100	100	100	100	100	100
	Max. airflow (@ 100%, nominal ESP)	m^3/h	11928	11928	21058	21058	21058	19806	19806	19806
Downflow Frontal/ Downflow Up Front Air Delivery	Nominal air flow	m^3/h	10000	10900	14500	15800	16300	12500	15500	16300
	ESP @ nominal airflow	Pa	0	0	0	0	0	0	0	0
	EC fan modulation	%	85	93	73	79	81	67	82	86
	Max ESP available@ nominal airflow	Pa	224	105	366	294	264	415	247	194
	EC fan modulation	%	100	100	100	100	100	100	100	100
	Max. airflow (@ 100%, nominal ESP)	m^3/h	11161	11611	19954	19954	19954	18854	18854	18854

MODELS			PX074	PX068	PX082	PX094	PX104	PX120	PX059 EXT	PX092 EXT
Power supply voltage		V/Ph/Hz				400 ±10% / 3 / 50				
Upflow	Nominal air flow	m^3/h	17600	18500	24000	26000	27000	27000	11200	17950
	ESP @ nominal airflow	Pa	50	50	50	50	50	50	50	50
	EC fan modulation	%	95	68	84	90	94	94	88	85
	Max ESP available@ nominal airflow	Pa	119	457	269	184	137	137	225	258
	EC fan modulation	%	100	100	100	100	100	100	100	100
	Max. airflow (@ 100%, nominal ESP)	m^3/h	18505	28739	28739	28739	28739	28739	12516	21009
Downflow Up	Nominal air flow	m^3/h	17600	18500	24000	26000	27000	27000	11200	17950
	ESP @ nominal airflow	Pa	20	20	20	20	20	20	20	20
	EC fan modulation	%	94	66	83	90	93	93	95	88
	Max ESP available@ nominal airflow	Pa	100	444	248	159	110	110	100	185
	EC fan modulation	%	100	100	100	100	100	100	100	100
	Max. airflow (@ 100%, nominal ESP)	m^3/h	18605	28738	28738	28738	28738	28738	11738	20166
Downflow Down	Nominal air flow	m^3/h	17600	18500	24000	26000	27000	27000	11200	17950
	ESP @ nominal airflow	Pa	20	20	20	20	20	20	20	20
	EC fan modulation	%	88	64	80	86	89	89	91	87
	Max ESP available@ nominal airflow	Pa	182	474	297	216	172	172	156	199
	EC fan modulation	%	100	100	100	100	100	100	100	100
	Max. airflow (@ 100%, nominal ESP)	m^3/h	19806	30090	30090	30090	30090	30090	12156	20399
Downflow Frontal/ Downflow Up Front Air Delivery	Nominal air flow	m^3/h	17600						11200	17950
	ESP @ nominal airflow	Pa	0						0	0
	EC fan modulation	%	93						93	87
	Max ESP available@ nominal airflow	Pa	100						98	185
	EC fan modulation	%	100						100	100
	Max. airflow (@ 100%, nominal ESP)	m^3/h	18854						11868	20412

Airflow characteristics

Tab. 6c — PXxxx F/D/H series, basic fan module

MODELS			PX041	PX047	PX051	PX044	PX054	PX062	PX068	PX082	PX094	PX104
Power supply voltage		V/Ph/Hz	400 ±10% / 3 / 50									
Upflow	Nominal air flow	m^3/h	9500	11650	11650	11350	11350	15200	18500	21200	21200	21200
	ESP @ nominal airflow	Pa	50	50	50	50	50	50	50	50	50	50
	EC fan modulation	%	94	91	91	92	92	96	84	96	96	96
	Max ESP available@ nominal airflow	Pa	149	182	182	176	176	118	281	110	110	110
	EC fan modulation	%	100	100	100	100	100	100	100	100	100	100
	Max. airflow (@ 100%, nominal ESP)	m^3/h	10213	12612	12612	12338	12338	16097	22163	22163	22163	22163
Downflow Up	Nominal air flow	m^3/h	9500	11650	11650	11350	11350	15200	18500	21200	21200	21200
	ESP @ nominal airflow	Pa	20	20	20	20	20	20	20	20	20	20
	EC fan modulation	%	94	90	90	90	90	95	83	95	95	95
	Max ESP available@ nominal airflow	Pa	121	167	167	164	164	95	272	98	98	98
	EC fan modulation	%	100	100	100	100	100	100	100	100	100	100
	Max. airflow (@ 100%, nominal ESP)	m^3/h	10199	12701	12701	12430	12430	16114	22336	22336	22336	22336
Downflow Down	Nominal air flow	m^3/h	9500	11650	11650	11350	11350	15200	18500	21200	21200	21200
	ESP @ nominal airflow	Pa	20	20	20	20	20	20	20	20	20	20
	EC fan modulation	%	90	88	88	88	88	89	79	90	90	90
	Max ESP available@ nominal airflow	Pa	186	204	204	199	199	187	323	165	165	165
	EC fan modulation	%	100	100	100	100	100	100	100	100	100	100
	Max. airflow (@ 100%, nominal ESP)	m^3/h	10729	13004	13004	12719	12719	17389	23336	23336	23336	23336
Downflow Frontal	Nominal air flow	m^3/h	9500	11650	11650	11350	11350	15200				
	ESP @ nominal airflow	Pa	0	0	0	0	0	0				
	EC fan modulation	%	93	93	93	93	93	94				
	Max ESP available@ nominal airflow	Pa	121	103	103	103	103	99				
	EC fan modulation	%	100	100	100	100	100	100				
	Max. airflow (@ 100%, nominal ESP)	m^3/h	10331	12347	12347	12097	12097	16338				

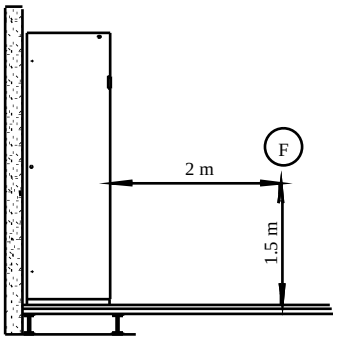
Tab. 6d — PXxxx F/D/H series, premium fan module

MODELS			PX041	PX047	PX051	PX044	PX054	PX062	PX068	PX082	PX094	PX104
Power supply voltage		V/Ph/Hz	400 ±10% / 3 / 50									
Upflow	Nominal air flow	m^3/h	10000	13200	15200	12500	15300	15900	18500	24000	25000	25000
	ESP @ nominal airflow	Pa	50	50	50	50	50	50	50	50	50	50
	EC fan modulation	%	94	77	87	77	92	95	73	91	95	95
	Max ESP available@ nominal airflow	Pa	136	361	226	341	160	115	389	168	120	120
	EC fan modulation	%	100	100	100	100	100	100	100	100	100	100
	Max. airflow (@ 100%, nominal ESP)	m^3/h	10588	17604	17604	16772	16772	16772	26488	26488	26488	26488
Downflow Up	Nominal air flow	m^3/h	10000	13200	15200	12500	15300	15900	18500	24000	25000	25000
	ESP @ nominal airflow	Pa	20	20	20	20	20	20	20	20	20	20
	EC fan modulation	%	94	76	86	76	91	94	72	91	94	94
	Max ESP available@ nominal airflow	Pa	107	348	208	331	146	102	377	149	99	99
	EC fan modulation	%	100	100	100	100	100	100	100	100	100	100
	Max. airflow (@ 100%, nominal ESP)	m^3/h	10580	17704	17704	16892	16892	16892	26528	26528	26528	26528
Downflow Down	Nominal air flow	m^3/h	10000	13200	15200	12500	15300	15900	18500	24000	25000	25000
	ESP @ nominal airflow	Pa	20	20	20	20	20	20	20	20	20	20
	EC fan modulation	%	90	72	81	72	86	89	70	87	90	90
	Max ESP available@ nominal airflow	Pa	158	396	275	374	209	170	407	198	152	152
	EC fan modulation	%	100	100	100	100	100	100	100	100	100	100
	Max. airflow (@ 100%, nominal ESP)	m^3/h	10950	18758	18758	17837	17837	17837	27640	27640	27640	27640
Downflow Frontal	Nominal air flow	m^3/h	10000	13200	15200	12500	15300	15900				
	ESP @ nominal airflow	Pa	0	0	0	0	0	0				
	EC fan modulation	%	92	74	84	74	89	92				
	Max ESP available@ nominal airflow	Pa	107	348	213	332	149	102				
	EC fan modulation	%	100	100	100	100	100	100				
	Max. airflow (@ 100%, nominal ESP)	m^3/h	10706	17937	17937	17122	17122	17122				

7 Sound Pressure Level

Liebert® PDX units have been designed with particular care for sound and vibration problems. The complete mechanical insulation of the ventilating section, combined with the special study of the aeraulic circuit as a consequence of accurate researches made in our thermodynamic laboratories and the oversizing of the components crossed by air offer the highest ventilation efficiency with the lowest sound emission.

Sound emission spectra



All tests are performed in our laboratories under the described conditions. The instrument is placed in (F) point, at 1.5 m from the ground in front of the machine at 2 m distance. Test conditions: Downflow unit with underflow air discharge and 20 Pa available external static pressure; Upflow unit with ducted air discharge and 50 Pa available external static pressure. Nominal air flow with clean F5 filters. Premium Fan Module, Digital Scroll Cooling system @100% cooling capacity. Ambient temperature 24°C and relative humidity 50%. Condensing temperature 45°C.
The noise levels refer to free field conditions.
The following tables show sound levels for every octave band frequency. The data are referred to the main used configurations; for different configurations consult Hirating software

Sound Pressure Level

Sound emission spectra

The following tables show sound levels for every octave band frequency.

Tab. 7a — A/W versions and Upflow configuration, Standard Height, Digital Scroll Cooling System @ 100% cooling capacity, Premium Fan Module, nominal airflow

MODEL	Mode	Level	Octave band frequency (Hz)									Sound Level [dB(A)]
			31.5	63	125	250	500	1000	2000	4000	8000	
PX041xA/W	(1)	SPL	62.6	62.6	64.4	61.4	57.3	54.3	50.4	43.8	34.7	59.8
	(2)	SPL	68.8	68.8	65.2	62.9	61.7	60.1	59.8	50	41	65.4
	(3)	PWL	101.1	101.1	92.1	90.5	92.2	92	95.3	82.3	73.4	98.6
PX045xA/W	(1)	SPL	65.2	65.2	67	64	59.9	56.9	53	46.4	37.3	62.4
	(2)	SPL	71.4	71.4	67.8	65.5	64.3	62.7	62.4	52.6	43.6	68
	(3)	PWL	103.7	103.7	94.7	93.1	94.8	94.6	97.9	84.9	76	101.2
PX047xA/W	(1)	SPL	53.2	53.2	67.6	55.2	54.2	52.1	49.6	41.9	31.8	57.9
	(2)	SPL	53.4	53.4	67.6	55.4	54.5	52.8	50.6	44.3	36.1	58.5
	(3)	PWL	80.2	80.2	92.4	82.2	81.4	80.1	78.2	73.3	67	85.5
PX051xA/W	(1)	SPL	55.5	55.5	69.9	57.5	56.5	54.4	51.9	44.2	34.1	60.2
	(2)	SPL	55.7	55.7	69.9	57.7	56.8	55.1	52.9	46.6	38.4	60.8
	(3)	PWL	82.5	82.5	94.7	84.5	83.7	82.4	80.5	75.6	69.3	87.8
PX057xA/W	(1)	SPL	56.5	56.5	70.9	58.5	57.5	55.4	52.9	45.2	35.1	61.2
	(2)	SPL	56.7	56.7	70.9	58.7	57.8	56.1	53.9	47.6	39.4	61.8
	(3)	PWL	83.5	83.5	95.7	85.5	84.7	83.4	81.5	76.6	70.3	88.8
PX044xA/W	(1)	SPL	51.8	51.8	66.2	53.8	52.8	50.7	48.2	40.5	30.4	56.5
	(2)	SPL	52	52	66.2	54	53.1	51.4	49.2	42.9	34.7	57.1
	(3)	PWL	78.8	78.8	91	80.8	80	78.7	76.8	71.9	65.6	84.1
PX054xA/W	(1)	SPL	57.3	57.3	71.7	59.3	58.3	56.2	53.7	46	35.9	62
	(2)	SPL	57.5	57.5	71.7	59.5	58.6	56.9	54.7	48.4	40.2	62.6
	(3)	PWL	84.3	84.3	96.5	86.3	85.5	84.2	82.3	77.4	71.1	89.6
PX062xA/W	(1)	SPL	58.8	58.8	73.2	60.8	59.8	57.7	55.2	47.5	37.4	63.5
	(2)	SPL	59	59	73.2	61	60.1	58.4	56.2	49.9	41.7	64.1
	(3)	PWL	85.8	85.8	98	87.8	87	85.7	83.8	78.9	72.6	91.1
PX074xA/W	(1)	SPL	60.8	60.8	75.2	62.8	61.8	59.7	57.2	49.5	39.4	65.5
	(2)	SPL	61	61	75.2	63	62.1	60.4	58.2	51.9	43.7	66.1
	(3)	PWL	87.8	87.8	100	89.8	89	87.7	85.8	80.9	74.6	93.1
PX068xA/W	(1)	SPL	60.5	60.5	64.6	58.5	54.7	52.8	49.4	42.2	32.3	58.1
	(2)	SPL	60.8	60.8	65.3	59.7	59.5	56.9	55	49.7	40.5	62.2
	(3)	PWL	87.7	87.7	92.6	87.5	90.9	87.6	87.2	83.8	75.3	93.6
PX082xA/W	(1)	SPL	66.8	66.8	70.9	64.8	61	59.1	55.7	48.5	38.6	64.4
	(2)	SPL	67.1	67.1	71.6	66	65.8	63.2	61.3	56	46.8	68.5
	(3)	PWL	94	94	98.9	93.8	97.2	93.9	93.5	90.1	81.6	99.9
PX094xA/W	(1)	SPL	69.2	69.2	73.3	67.2	63.4	61.5	58.1	50.9	41	66.8
	(2)	SPL	69.5	69.5	74	68.4	68.2	65.6	63.7	58.4	49.2	70.9
	(3)	PWL	96.4	96.4	101.3	96.2	99.6	96.3	95.9	92.5	84	102.3
PX104xA/W	(1)	SPL	70.3	70.3	74.4	68.3	64.5	62.6	59.2	52	42.1	67.9
	(2)	SPL	70.6	70.6	75.1	69.5	69.3	66.7	64.8	59.5	50.3	72
	(3)	PWL	97.5	97.5	102.4	97.3	100.7	97.4	97	93.6	85.1	103.4
PX120xA/W	(1)	SPL	70.3	70.3	74.4	68.3	64.5	62.6	59.2	52	42.1	67.9
	(2)	SPL	70.6	70.6	75.1	69.5	69.3	66.7	64.8	59.5	50.3	72
	(3)	PWL	97.5	97.5	102.4	97.3	100.7	97.4	97	93.6	85.1	103.4

LEGEND

The sound levels global and for each octave band are expressed in dB with a tolerance of (−0/+2) dB.

(1) *Only ventilation (50 Pa available external static pressure), 2 m in front of the unit and 1.5 m height, in free field conditions.*

(2) *Working compressor (50 Pa available external static pressure), 2 m in front of the unit and 1.5 m height, in free field conditions.*

(3) *Working compressor, on discharge side.*

Level

SPL *sound pressure level*

PWL *sound power level*

Sound Pressure Level

Tab. 7b — A/W versions and Upflow configuration, Extended Height, Digital Scroll Cooling System @ 100% cooling capacity, Premium Fan Module, nominal airflow

MODEL	Mode	Level	Octave band frequency (Hz)									Sound Level [dB(A)]
			31.5	63	125	250	500	1000	2000	4000	8000	
PX059xA/W	(1)	SPL	64.3	64.3	66.1	63.1	59	56	52.1	45.5	36.4	61.5
	(2)	SPL	70.5	70.5	66.9	64.6	63.4	61.8	61.5	51.7	42.7	67.1
	(3)	PWL	102.8	102.8	93.8	92.2	93.9	93.7	97	84	75.1	100.3
PX092xA/W	(1)	SPL	57.2	57.2	71.6	59.2	58.2	56.1	53.6	45.9	35.8	61.9
	(2)	SPL	57.4	57.4	71.6	59.4	58.5	56.8	54.6	48.3	40.1	62.5
	(3)	PWL	84.2	84.2	96.4	86.2	85.4	84.1	82.2	77.3	71	89.5

LEGEND

The sound levels global and for each octave band are expressed in dB with a tolerance of (−0/+2) dB.

(1) *Only ventilation (50 Pa available external static pressure), 2 m in front of the unit and 1.5 m height, in free field conditions.*

(2) *Working compressor (50 Pa available external static pressure), 2 m in front of the unit and 1.5 m height, in free field conditions.*

(3) *Working compressor, on discharge side.*

Level

SPL *sound pressure level*

PWL *sound power level*

Tab. 7c — F/D/H versions and Uplow configuration, Standard Height, Digital Scroll Cooling System @ 100% cooling capacity, Premium Fan Module, nominal airflow

MODEL	Mode	Level	Octave band frequency (Hz)									Sound Level [dB(A)]
			31.5	63	125	250	500	1000	2000	4000	8000	
PX041xF/D/H	(1)	SPL	65.3	65.3	67.1	64.1	60	57	53.1	46.5	37.4	62.5
	(2)	SPL	71.5	71.5	67.9	65.6	64.4	62.8	62.5	52.7	43.7	68.1
	(3)	PWL	103.8	103.8	94.8	93.2	94.9	94.7	98	85	76.1	101.3
PX047xF/D/H	(1)	SPL	54.6	54.6	69	56.6	55.6	53.5	51	43.3	33.2	59.3
	(2)	SPL	54.8	54.8	69	56.8	55.9	54.2	52	45.7	37.5	59.9
	(3)	PWL	81.6	81.6	93.8	83.6	82.8	81.5	79.6	74.7	68.4	86.9
PX051xF/D/H	(1)	SPL	58.5	58.5	72.9	60.5	59.5	57.4	54.9	47.2	37.1	63.2
	(2)	SPL	58.7	58.7	72.9	60.7	59.8	58.1	55.9	49.6	41.4	63.8
	(3)	PWL	85.5	85.5	97.7	87.5	86.7	85.4	83.5	78.6	72.3	90.8
PX044xF/D/H	(1)	SPL	55.4	55.4	69.8	57.4	56.4	54.3	51.8	44.1	34	60.1
	(2)	SPL	55.6	55.6	69.8	57.6	56.7	55	52.8	46.5	38.3	60.7
	(3)	PWL	82.4	82.4	94.6	84.4	83.6	82.3	80.4	75.5	69.2	87.7
PX054xF/D/H	(1)	SPL	60.7	60.7	75.1	62.7	61.7	59.6	57.1	49.4	39.3	65.4
	(2)	SPL	60.9	60.9	75.1	62.9	62	60.3	58.1	51.8	43.6	66
	(3)	PWL	87.7	87.7	99.9	89.7	88.9	87.6	85.7	80.8	74.5	93
PX062xF/D/H	(1)	SPL	60.9	60.9	75.3	62.9	61.9	59.8	57.3	49.6	39.5	65.6
	(2)	SPL	61.1	61.1	75.3	63.1	62.2	60.5	58.3	52	43.8	66.2
	(3)	PWL	87.9	87.9	100.1	89.9	89.1	87.8	85.9	81	74.7	93.2
PX068xF/D/H	(1)	SPL	63.3	63.3	67.4	61.3	57.5	55.6	52.2	45	35.1	60.9
	(2)	SPL	63.6	63.6	68.1	62.5	62.3	59.7	57.8	52.5	43.3	65
	(3)	PWL	90.5	90.5	95.4	90.3	93.7	90.4	90	86.6	78.1	96.4
PX082xF/D/H	(1)	SPL	70.1	70.1	74.2	68.1	64.3	62.4	59	51.8	41.9	67.7
	(2)	SPL	70.4	70.4	74.9	69.3	69.1	66.5	64.6	59.3	50.1	71.8
	(3)	PWL	97.3	97.3	102.2	97.1	100.5	97.2	96.8	93.4	84.9	103.2
PX094xF/D/H	(1)	SPL	71	71	75.1	69	65.2	63.3	59.9	52.7	42.8	68.6
	(2)	SPL	71.3	71.3	75.8	70.2	70	67.4	65.5	60.2	51	72.7
	(3)	PWL	98.2	98.2	103.1	98	101.4	98.1	97.7	94.3	85.8	104.1
PX104xF/D/H	(1)	SPL	69.6	69.6	73.7	67.6	63.8	61.9	58.5	51.3	41.4	67.2
	(2)	SPL	69.9	69.9	74.4	68.8	68.6	66	64.1	58.8	49.6	71.3
	(3)	PWL	96.8	96.8	101.7	96.6	100	96.7	96.3	92.9	84.4	102.7

LEGEND

The sound levels global and for each octave band are expressed in dB with a tolerance of (−0/+2) dB.

(1) *Only ventilation (50 Pa available external static pressure), 2 m in front of the unit and 1.5 m height, in free field conditions.*

(2) *Working compressor (50 Pa available external static pressure), 2 m in front of the unit and 1.5 m height, in free field conditions.*

(3) *Working compressor, on discharge side.*

Level

SPL *sound pressure level*

PWL *sound power level*

Sound Pressure Level

Tab. 7d — A/W versions and Downflow Up configuration, Standard Height, Digital Scroll Cooling System @ 100% cooling capacity, Premium Fan Module, nominal airflow

MODEL	Mode	Level	Octave band frequency (Hz)									Sound Level [dB(A)]
			31.5	63	125	250	500	1000	2000	4000	8000	
PX041xA/W	(1)	SPL	59.7	59.7	64.8	58.2	55.7	54.5	52	46.6	35.7	59.5
	(2)	SPL	64	64	66.3	59	57.8	57.6	56.1	50.9	39.5	62.5
	(3)	PWL	94.9	94.9	94.4	86.4	86.5	87.3	86.8	81.8	69.9	92.3
PX045xA/W	(1)	SPL	62.4	62.4	67.5	60.9	58.4	57.2	54.7	49.3	38.4	62.2
	(2)	SPL	66.7	66.7	69	61.7	60.5	60.3	58.8	53.6	42.2	65.2
	(3)	PWL	97.6	97.6	97.1	89.1	89.2	90	89.5	84.5	72.6	95
PX047xA/W	(1)	SPL	57	57	62.3	58.8	53.9	51.5	46.5	38.6	29.8	56.8
	(2)	SPL	57.9	57.9	63.5	59.5	55.5	55.4	48.9	42.2	33.5	59.1
	(3)	PWL	85.4	85.4	91.3	86.8	83.7	85.9	77.9	72.4	63.8	88.5
PX051xA/W	(1)	SPL	59.4	59.4	64.7	61.2	56.3	53.9	48.9	41	32.2	59.2
	(2)	SPL	60.3	60.3	65.9	61.9	57.9	57.8	51.3	44.6	35.9	61.5
	(3)	PWL	87.8	87.8	93.7	89.2	86.1	88.3	80.3	74.8	66.2	90.9
PX057xA/W	(1)	SPL	60.4	60.4	65.7	62.2	57.3	54.9	49.9	42	33.2	60.2
	(2)	SPL	61.3	61.3	66.9	62.9	58.9	58.8	52.3	45.6	36.9	62.5
	(3)	PWL	88.8	88.8	94.7	90.2	87.1	89.3	81.3	75.8	67.2	91.9
PX044xA/W	(1)	SPL	55.3	55.3	60.6	57.1	52.2	49.8	44.8	36.9	28.1	55.1
	(2)	SPL	56.2	56.2	61.8	57.8	53.8	53.7	47.2	40.5	31.8	57.4
	(3)	PWL	83.7	83.7	89.6	85.1	82	84.2	76.2	70.7	62.1	86.8
PX054xA/W	(1)	SPL	61.1	61.1	66.4	62.9	58	55.6	50.6	42.7	33.9	60.9
	(2)	SPL	62	62	67.6	63.6	59.6	59.5	53	46.3	37.6	63.2
	(3)	PWL	89.5	89.5	95.4	90.9	87.8	90	82	76.5	67.9	92.6
PX062xA/W	(1)	SPL	62.7	62.7	68	64.5	59.6	57.2	52.2	44.3	35.5	62.5
	(2)	SPL	63.6	63.6	69.2	65.2	61.2	61.1	54.6	47.9	39.2	64.8
	(3)	PWL	91.1	91.1	97	92.5	89.4	91.6	83.6	78.1	69.5	94.2
PX074xA/W	(1)	SPL	64.9	64.9	70.2	66.7	61.8	59.4	54.4	46.5	37.7	64.7
	(2)	SPL	65.8	65.8	71.4	67.4	63.4	63.3	56.8	50.1	41.4	67
	(3)	PWL	93.3	93.3	99.2	94.7	91.6	93.8	85.8	80.3	71.7	96.4
PX068xA/W	(1)	SPL	59.2	59.2	65.9	59.6	55.1	54.2	51.6	44.3	35.8	59.4
	(2)	SPL	61.8	61.8	66.3	59.9	56.6	56.4	54	47.1	38.6	61.1
	(3)	PWL	91	91	93.3	86.8	84.7	85.2	83	76.5	68	89.6
PX082xA/W	(1)	SPL	66	66	72.7	66.4	61.9	61	58.4	51.1	42.6	66.2
	(2)	SPL	68.6	68.6	73.1	66.7	63.4	63.2	60.8	53.9	45.4	67.9
	(3)	PWL	97.8	97.8	100.1	93.6	91.5	92	89.8	83.3	74.8	96.4
PX094xA/W	(1)	SPL	68.5	68.5	75.2	68.9	64.4	63.5	60.9	53.6	45.1	68.7
	(2)	SPL	71.1	71.1	75.6	69.2	65.9	65.7	63.3	56.4	47.9	70.4
	(3)	PWL	100.3	100.3	102.6	96.1	94	94.5	92.3	85.8	77.3	98.9
PX104xA/W	(1)	SPL	69.6	69.6	76.3	70	65.5	64.6	62	54.7	46.2	69.8
	(2)	SPL	72.2	72.2	76.7	70.3	67	66.8	64.4	57.5	49	71.5
	(3)	PWL	101.4	101.4	103.7	97.2	95.1	95.6	93.4	86.9	78.4	100
PX120xA/W	(1)	SPL	69.6	69.6	76.3	70	65.5	64.6	62	54.7	46.2	69.8
	(2)	SPL	72.2	72.2	76.7	70.3	67	66.8	64.4	57.5	49	71.5
	(3)	PWL	101.4	101.4	103.7	97.2	95.1	95.6	93.4	86.9	78.4	100

LEGEND

The sound levels global and for each octave band are expressed in dB with a tolerance of (−0/+2) dB.

(1) *Only ventilation (20 Pa available external static pressure), 2 m in front of the unit and 1.5 m height, in free field conditions.*

(2) *Working compressor (20 Pa available external static pressure), 2 m in front of the unit and 1.5 m height, in free field conditions.*

(3) *Working compressor, on discharge side.*

Level

SPL *sound pressure level*

PWL *sound power level*

Sound Pressure Level

Tab. 7e — A/W versions and Downflow Down configuration, Extended Height, Digital Scroll Cooling System @ 100% cooling capacity, Premium Fan Module, nominal airflow

MODEL	Mode	Level	Octave band frequency (Hz)									Sound Level [dB(A)]
			31.5	63	125	250	500	1000	2000	4000	8000	
PX059xA/W	(1)	SPL	60.6	60.6	65.7	59.1	56.6	55.4	52.9	47.5	36.6	60.4
	(2)	SPL	64.9	64.9	67.2	59.9	58.7	58.5	57	51.8	40.4	63.4
	(3)	PWL	95.8	95.8	95.3	87.3	87.4	88.2	87.7	82.7	70.8	93.2
PX092xA/W	(1)	SPL	60.8	60.8	66.1	62.6	57.7	55.3	50.3	42.4	33.6	60.6
	(2)	SPL	61.7	61.7	67.3	63.3	59.3	59.2	52.7	46	37.3	62.9
	(3)	PWL	89.2	89.2	95.1	90.6	87.5	89.7	81.7	76.2	67.6	92.3

LEGEND

The sound levels global and for each octave band are expressed in dB with a tolerance of (−0/+2) dB.

(1) *Only ventilation (20 Pa available external static pressure), 2 m in front of the unit and 1.5 m height, in free field conditions.*

(2) *Working compressor (20 Pa available external static pressure), 2 m in front of the unit and 1.5 m height, in free field conditions.*

(3) *Working compressor, on discharge side.*

Level

SPL *sound pressure level*

PWL *sound power level*

Tab. 7f — F/D/H versions and Downflow Up configuration, Standard Height, Digital Scroll Cooling System @ 100% cooling capacity, Premium Fan Module, nominal airflow

MODEL	Mode	Level	Octave band frequency (Hz)									Sound Level [dB(A)]
			31.5	63	125	250	500	1000	2000	4000	8000	
PX041xF/D/H	(1)	SPL	62.1	62.1	67.2	60.6	58.1	56.9	54.4	49	38.1	61.9
	(2)	SPL	66.4	66.4	68.7	61.4	60.2	60	58.5	53.3	41.9	64.9
	(3)	PWL	97.3	97.3	96.8	88.8	88.9	89.7	89.2	84.2	72.3	94.7
PX047xF/D/H	(1)	SPL	58.2	58.2	63.5	60	55.1	52.7	47.7	39.8	31	58
	(2)	SPL	59.1	59.1	64.7	60.7	56.7	56.6	50.1	43.4	34.7	60.3
	(3)	PWL	86.6	86.6	92.5	88	84.9	87.1	79.1	73.6	65	89.7
PX051xF/D/H	(1)	SPL	62.4	62.4	67.7	64.2	59.3	56.9	51.9	44	35.2	62.2
	(2)	SPL	63.3	63.3	68.9	64.9	60.9	60.8	54.3	47.6	38.9	64.5
	(3)	PWL	90.8	90.8	96.7	92.2	89.1	91.3	83.3	77.8	69.2	93.9
PX044xF/D/H	(1)	SPL	58.8	58.8	64.1	60.6	55.7	53.3	48.3	40.4	31.6	58.6
	(2)	SPL	59.7	59.7	65.3	61.3	57.3	57.2	50.7	44	35.3	60.9
	(3)	PWL	87.2	87.2	93.1	88.6	85.5	87.7	79.7	74.2	65.6	90.3
PX054xF/D/H	(1)	SPL	64.5	64.5	69.8	66.3	61.4	59	54	46.1	37.3	64.3
	(2)	SPL	65.4	65.4	71	67	63	62.9	56.4	49.7	41	66.6
	(3)	PWL	92.9	92.9	98.8	94.3	91.2	93.4	85.4	79.9	71.3	96
PX062xF/D/H	(1)	SPL	65.5	65.5	70.8	67.3	62.4	60	55	47.1	38.3	65.3
	(2)	SPL	66.4	66.4	72	68	64	63.9	57.4	50.7	42	67.6
	(3)	PWL	93.9	93.9	99.8	95.3	92.2	94.4	86.4	80.9	72.3	97
PX068xF/D/H	(1)	SPL	61.9	61.9	68.6	62.3	57.8	56.9	54.3	47	38.5	62.1
	(2)	SPL	64.5	64.5	69	62.6	59.3	59.1	56.7	49.8	41.3	63.8
	(3)	PWL	93.7	93.7	96	89.5	87.4	87.9	85.7	79.2	70.7	92.3
PX082xF/D/H	(1)	SPL	69.2	69.2	75.9	69.6	65.1	64.2	61.6	54.3	45.8	69.4
	(2)	SPL	71.8	71.8	76.3	69.9	66.6	66.4	64	57.1	48.6	71.1
	(3)	PWL	101	101	103.3	96.8	94.7	95.2	93	86.5	78	99.6
PX094xF/D/H	(1)	SPL	70.2	70.2	76.9	70.6	66.1	65.2	62.6	55.3	46.8	70.4
	(2)	SPL	72.8	72.8	77.3	70.9	67.6	67.4	65	58.1	49.6	72.1
	(3)	PWL	102	102	104.3	97.8	95.7	96.2	94	87.5	79	100.6
PX104xF/D/H	(1)	SPL	70.2	70.2	76.9	70.6	66.1	65.2	62.6	55.3	46.8	70.4
	(2)	SPL	72.8	72.8	77.3	70.9	67.6	67.4	65	58.1	49.6	72.1
	(3)	PWL	102	102	104.3	97.8	95.7	96.2	94	87.5	79	100.6

LEGEND

The sound levels global and for each octave band are expressed in dB with a tolerance of (−0/+2) dB.

(1) *Only ventilation (20 Pa available external static pressure), 2 m in front of the unit and 1.5 m height, in free field conditions.*

(2) *Working compressor (20 Pa available external static pressure), 2 m in front of the unit and 1.5 m height, in free field conditions.*

(3) *Working compressor, on discharge side.*

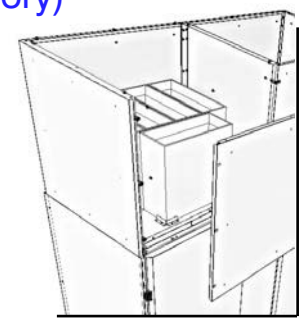
Level

SPL *sound pressure level*

PWL *sound power level*

Sound Pressure Level

Plenum with silencing cartridges (accessory)



These are special cartridges made of self–extinguishing material with a high noise attenuation capacity. They are guaranteed against disintegration and release of particles do to friction of the air.
It is possible to install the supplied plenum 600mm height with **one** row of cartridges over the unit.
Despite a small additional pressure drop, these cartridges provide a remarkable sound power level reduction.

Tab. 7g — Features of silencing cartridges

Models	Dimensions	Free Section	Cartridge Number
	[mm]	[mm]	
PX041–PX045–PX059	500 x 195 x 500	400 x 100	7
PX047–PX051–PX057–PX044 PX054–PX062–PX074–PX092	500 x 195 x 500	400 x 100	11
PX068–PX082–PX094 PX104–PX120	500 x 195 x 500	400 x 100	16

Tab. 7h — Attenuation in dB silencing cartridges

row no.	Attenuation in dB at different frequency values (Hz)							
	63	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
1	1	4	7	15	26	28	27	14

Tab. 7i — Pressure drops silencing cartridges

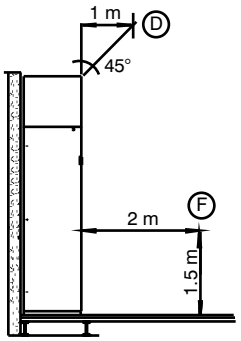
row no.	Pressure drops (Pa) for each module at different air flows (m^3/s)				
	0.2	**0.3**	**0.4**	**0.5**	**0.6**
1	1	2	4	7	9

Tab. 7j — Approximate variations of Sound Pressure Level

Variations compared to values measured without noise reduction duct: free discharge (for Upflow units) or free suction (Downflow units).

Position **F**: 2 meters from the front, 1.5 meter from the ground

Position **D**: 1 meter from the front, 45° from the top



Unit Configuration	Plenum Height	Cartridge Rows Number	Position	
			F	**D**
Downflow Up	600 mm	1	–4.0 dB	–7.0 dB
Upflow	600 mm	1	–7.5 dB	–12.0 dB

8 Technical Specifications

Fans (CRAC unit)

The units install innovating EC fans incorporating an impeller with curved blades corrosion resistant made of fibreglass plastic. This new technology allows keeping the current high−strength of aluminium alloy adding the benefits of light weight and full flexibility on blade design of the new material. The good dampening behaviour of the plastic also helps to reduce noise emissions.
The optimised aerodynamic design permits achieving high energy efficiency and a reduced noise level.

Other benefits came form the EC motors, it is comparable to the DC brush−less motor, except that the magnetic field is produced by permanent magnets in the rotor; the commutation is done electronically and therefore without wear.
The EC Fans are controlled via a linear interface, 0−10Vdc, through iCOM.
The motor is three−phase with IP54 protection; provided with internal thermal protection.
The fan wheel is statically and dynamically balanced; the bearings are self−lubricating.

Compressor

Scroll compressors.

The scroll is a simple compression concept first patented in 1905. A scroll is an involute spiral which, when matched with a mating scroll form, generates a series of crescent shaped gas pockets between the two members. During compression, one scroll remains stationary (fixed scroll) while the other form (orbiting scroll) is allowed to orbit (but not rotate) around the first form. As this motion occurs, the pockets between the two forms are slowly pushed to the center of the two scrolls while simultaneously being reduced in volume. When the pocket reaches the center of the scroll form, the gas, which is now at a high pressure, is discharged out of a port located at the center. During compression, several pockets are being compressed simultaneously, resulting in a very smooth process. Both the suction process (outer portion of the scroll members) and the discharge process (inner portion) are continuous.

High COP (Coefficient Of Performance)

High MTBF (Mean Time Between Failure)

Low sound level

Vibration−damped

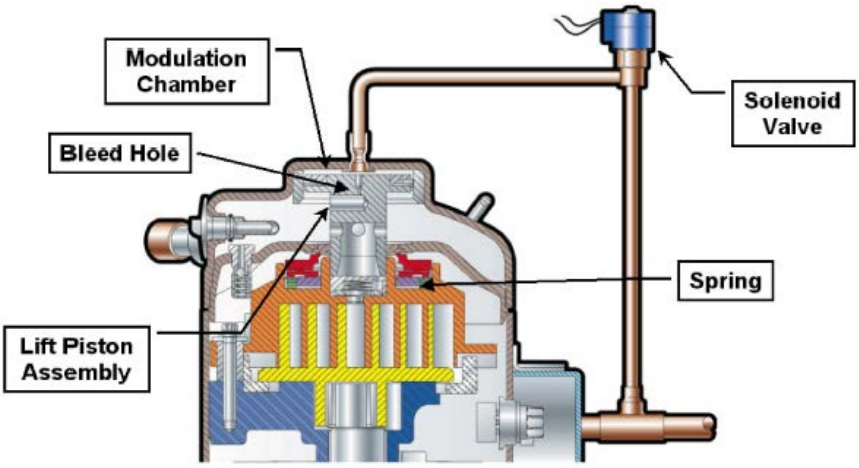
Provided with internal thermal protection

Low pickup current (equalization of the internal pressures).

Digital Scroll compressor (Digit 6)

When it is mandatory to have a precise and continuous equivalence between the load and the cooling capacity. We get this through the innovative compressor: the Copeland Digital Scroll. It uses a simple and effective method to modulate the capacity, giving unparalleled performance in the modulation field.
The controlled separation of the scrolls is achieved using a solenoid valve and a bypass connection between the discharge chamber and the gas intake (See Fig.8.a). The scrolls are designed so that the upper scroll can separate from the bottom scroll by 1mm vertically. A piston is attached on top of the upper scroll and will lift up the upper scroll when it moves up. When the solenoid valve is closed, the Digital Scroll operates as a normal scroll compressor and the compressed gas is discharged at high pressure through the normal piping. When the solenoid valve is opened, the discharge chamber and intake gas pressure becomes connected, thereby releasing some of the discharge pressure. This leads to less pressure holding the piston down thereby causing the piston to shift upwards, which in turn lifts the upper scroll. Once the scrolls separate, any gas passing through is no longer compressed.
The Digital Scroll operates in two stages − the ”Loaded state”, when the solenoid valve is normally closed and ”Unloaded state”, when the solenoid valve is open. During the loaded state the compressor operates like a standard scroll and delivers full capacity and mass flow. However, during the unloaded state, there is no capacity and no mass flow through the compressor.

Fig. 8.a



At this stage, let us introduce the concept of a cycle time. A cycle time consists of a ”Loaded State” time and ”Unloaded State” time. The duration of these 2—time segments determine the capacity modulation of the compressor. Example: In a 20 seconds cycle time, if the loaded state time is 10 seconds and the unloaded state time is 10 seconds, the compressor modulation is 50%. If for the same cycle time, the loaded state time is 15 seconds and the unloaded state time is 5 seconds, the compressor modulation is 75%. The capacity is a time averaged summation of the loaded state and unloaded state. By varying the loaded state time and unloaded state time, any capacity between 10% and 100% can be delivered by the compressor. Hence, the Copeland Digital Scroll can achieve a continuous modulation of AC capacity to suit the system’s needs precisely.
We could vary the cycle time and still achieve the same effective capacity, but Copeland and Liebert have done extensive testing to optimize the cycle time in this application.

Electronic Expansion Valve (Digit 6)

The valve is designed for modulating control of refrigerant circuits with highspeed and high precision. The EEV provides superior performance compared to a Thermostatic Expansion Valve (TXV), due to:

- Precise flow control
- Positioning time

EEV ensures a better control on super heating at the end of the evaporator, ensuring at the same time that compressor will never be filled by liquid from the 10% to 110% of its nominal capacity, instead a mechanical one cannot ensure it. It has to be calibrated and then it will work properly but only around the calibration point.
This means that a TXV works better (i.e. better control, longer life) with a condensing pressure as much as possible constant. For such reason with TXV the condensing temperature is kept around 45°C as set point. But during the coldest period the condensing temperature can be lowered and the electronic expansion valve adapts to this new situation. This permits an increase of the cooling capacity of the unit, a decrease of the unit power input and so increase the energy efficiency of the entire Liebert® PDX unit.
Liebert® PDX allows having an option the EEV both on Standard Scroll and on Digital Scroll. The choice is driven by the application:

- Only temperature control — or wide range or Humidity band T→In this case the EEV gives a great efficiency effects both with Standard and Digital Scroll technology. To get the biggest advantage, a different pressure set point can be used for the fan speed controller of the Liebert remote condenser.
- Close Humidity control → Often, even the TXV valve allows to get good results, mainly thanks to the Digital Scroll modulation.

Digital range — Major Benefits

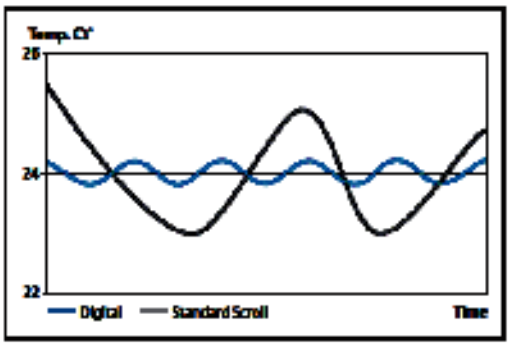
Emerson Network Power is proud to offer a new possibility to have the best technologic evolutions in your cooling unit, adding to an already optimum product a wide range of benefits:
Modulation (as explained in Digital Scroll Chapter):

- Perfect match between Cooling Capacity and Heat Load.
- Lower power input at partial load.
- Quick adaptation to changing heat load.
- Possibility to size cooling system to overcome future heat load growth

Precision Control:

- More precise room temperature control.
  Once you make a direct comparisons between standard units using standard scroll compressors and Liebert® PDX, is necessary to notice that Liebert® PDX has a very high precision in control room temperature; so all the advantages exponentially increase comparing Liebert® PDX to a standard unit with the same tolerances on controlling the temperature.

Fig. 8.b



In fact to guarantee the same precision, standard scroll technology has to use additional technologies, like hot gas by pass or hot gas injection, and others, to avoid the compressor shut off and to avoid loosing temperature control. All these techniques are very energy expensive and for this reason we can say that Liebert® PDX offers more requiring less.

Availability & Reliability:

- Less number of start/stop cycling means longer unit life.
  As described previously, at partial load, a Digital Scroll does not work with ON - OFF configuration. This avoids peaks in adsorbed power and reduces stress on components. This increases the life of the unit, greatly reducing failure due to fatigue.
- Wide operational limits for higher availability.
  To maximise the possible advantages coming from the thermodynamic functioning of Liebert® PDX, Emerson Network Power has developed a special software; with an additional pressure transducer the control, when external air temperature increases over standard functioning limits, commands the compressor to modulate his capacity. Forcing the condensing temperature to decrease under the limit, even when at partial load, the unit guarantees refrigeration; standard units in the same condition would fail. So when you size your requested unit you consider the worst external conditions; it can happen that occasionally during the year it will be hotter than your design ambient temperature. In this case a standard unit will shut down due to high condensing temperatures, leaving your Data Center without cooling when the requirement is at its highest, however your Liebert® PDX will guarantee a partial cooling capacity. So System availability is guaranteed even during extreme operating conditions.

Increased Efficiency due to:

- COP and SHR Effect.
  At partial load alternation between loaded and unloaded states involves a reduction on nominal mass flow both on the evaporator and on the condenser. This gives digital technology two important thermodynamic advantages: higher evaporating temperatures and lower condensing temperatures. These are both important characteristics, the evaporating temperature is directly related to cooling capacity, and a higher evaporating temperature means a higher cooling capacity. Condensing temperature is directly related to power input, and lower it is the lower the power consumption of the compressor. Consequently the Digital scroll increases its COP at partial load (higher then 75%) in fact the higher evaporating temperature and lower condensing temperature gives higher cooling capacity and lower power input.
- EEV Effect (as explained in the relevant chapter).
- EC Fan Effect (as explained in the relevant chapter).

Thanks to all these effects we can have a reduction up to 50% on the yearly energy consumption and a return of investment lower then half a year (considering a comparison versus a standard Room Cooling Unit with standard Scroll, standard AC Fan and standard Thermostatic Expansion Valve, placed in a city in the Central Europe).

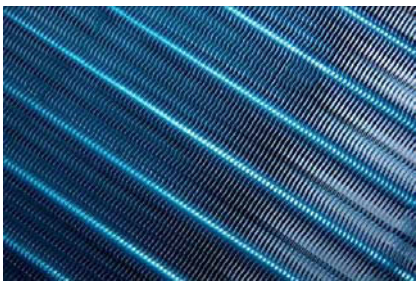
Technical Specifications

Refrigerant

The units are designed for being used with refrigerant R410A.

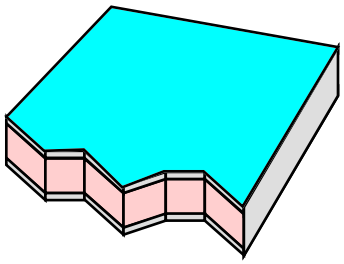
Coils

DX refrigerant / Chilled water/room air



High frontal surface.
Made of copper pipes and aluminium fins.
Fins treated with hydrofile styrol acrylic
paints to withstand corrosive atmospheres.
Low pressure drop.
High SHR (Sensible Heat Ratio).
In dual circuit units, the dual stage coil increases the SHR, at partial load the efficiency is strongly increased due to the use of the total amount of airflow and frontal coil surface.

Frame and panels



The sheet steel structure, painted with epoxy−polyester powders, is assembled by stainless steel rivets; the paneling system ensures higher stiffness; there will also be some pluggings for guaranteeing both safety and high acoustic absorption.
The frontal panel is assembled on hinges to make the access easier; this can be opened by the fast closing lock.
The rear and side panels are screwed to the supports. The rear panel is screwed directly to the frame.
The panels are lined with thermoacoustic insulating material − class 0 (ISO 1182.2) with thermal conductivity 0.04 W/mK and density from 20 to 50 kg/m^3.
The internal sheet metal parts are made of hot−dip galvanized steel in order to provide corrosion protection and avoid zinc whiskers growing.

Electric panel

The electric panel is housed in the frontal part of the unit, behind the right door. It is insulated against the air flow and protected by a cover, so as to avoid tampering by non−authorized personnel and to protect the electric panel parts supplied with a voltage higher than 24 V.
Once open the electrical panel could be rotate on the right to make the installation procedure and maintenance easier.
The electric panel complies with the norm 204−1 IEC.
The air conditioners have been provided for operating at 400 V~/3/50 Hz+N+G (as alternative execution, the version with 230~V/3/50Hz + G can be supplied in the majority of cases).
Magnetothermal switches are supplied as protection of every electric component.
A single−phase transformer has been provided for supplying power to the secondary circuit at 24V.
There will be an automatic start−up after a possible stop due to power supply lack.
Additional terminals for remote start−up and carry of some operating conditions (fans and compressors) or connection of additional devices (Liquistat, Firestat, Smokestat, clogged filters) are set in series on the terminal panel of the electric panel. On the terminal panel there is also a clean contact for the remote signalling of the general alarm.

The panels are lined with thermoacoustic insulating material − class 0 (ISO 1182.2).

Humidification (Digit 11)

Liebert® PDX offers the possibility to choose between Electrode, Ultrasonic and Infrared Humidifiers.
Depending on which is the priority between the water characteristics and the efficiency Liebert® PDX is able to give the right solution:

- Ultrasonic Humidifier: Top Efficient solution to manage the humidification process. The Ultrasonic Humidifier needs a correct water treatment to allow the system work properly.
- Infrared Humidifier: this is the perfect solution whenever there is not the possibility to have a high quality of water. In fact Infrared Humidifier does not suffer any performance decade based on

water conductivity (as happens for common electrode solution); additionally it does not require a specific water treatment.

- Electrode Humidifier: this is the most common solution in European Data Center, providing efficiency level once it works with the correct water conductivity.

For complete details about humidifiers solution see Chapter 11.

Electrical Heaters (Digit 13)

for Heating Mode and reheating in dehumidification mode.

A stage of electrical heater is available for each Liebert® PDX. If necessary for units with 2 or 3 fans it is possible install as well a second stage of electrical heater to increase significantly the heating power.
Each stage of heaters are made of finned armored stainless steel AISI 304. to maintain a low surfaces power density. Ionization effects are eliminated owing to the low heater surface temperature.
There an ON–OFF type electronic temperature controller, a safety thermostat with manual reset, a circuit breaker for short–circuit protection and harness protection from possible accidental contact.

The electrical heating can work as well the dehumidification system is activated; in this way humidity sensor and indicator are necessary and provided on request.

Electrical heating can be installed combined with hot gas or hot water heating.

Tab. 8a – Features of Electrical heating system at nominal airflow

Model	ELECTRICAL HEATING			
	Std. Capacity		Opt. High Capacity	
	FLA [A]	nominal power [kW]	FLA [A]	nominal power [kW]
	(400V / 3Ph / 50Hz)			
PX041	10.8	7.5	–	–
PX045				
PX059				
PX047			21.6 *	15 *
PX051			21.6 *	15 *
PX057			21.6	15
PX044			21.6 *	15 *
PX054			21.6 *	15 *
PX062			21.6	15
PX074			21.6	15
PX092			21.6	15
PX068			21.6 ** 32.5 ***	15 ** 22.5 ***
PX082			21.6 ** 32.5 ***	15 ** 22.5 ***
PX094			21.6 ** 32.5 ***	15 ** 22.5 ***
PX104			21.6 ** 32.5 ***	15 ** 22.5 ***
PX120			32.5	22.5

* Not available with Basic Fan Module.
** With Basic Fan Module.
*** With Premium Fan Module.

Hot Water Coil (Digit 13)

for heating and reheating mode and dehumidification system

The hot water heating is a copper pipes and aluminium fins coil, with one row, test pressure 30 bar and includes an exhaust valve. A three–way on–off valve directly driven by the microprocessor controller is supplied as standard. A hot water thermostat (provided by the customer) is installed to indicate the presence of hot water at the correct temperature. The heating system can work even if the dehumidification system is activated; in this case humidity sensor and an indicator are necessary and are provided on request.

Note: Hot water power in F, D, H units could slightly differ from hot water power in A, W units.

Tab. 8b – Features of hot water reheat system at nominal airflow, Premium Fan Module

MODELS		PX041	PX045	PX047	PX051	PX057	PX044	PX054	PX062
rows	no.	2	2	2	2	2	2	2	2
surface	m^2	0.324	0.324	0.549	0.549	0.549	0.549	0.549	0.549
indoor temp. 24°C, 50% R.H.; water inlet/outlet temperature 80/65°C									
Power (re–heating)	kW	25.4	26.8	41.6	44.7	45.9	40.7	46.7	48.6
water flow	l/s	0.413	0.437	0.679	0.729	0.748	0.664	0.762	0.793
coil side pressure drops	kPa	1	1	1	1	1	1	1	1
total pressure drops	kPa	10	11	24	28	29	23	30	33

MODELS		PX074	PX068	PX082	PX094	PX104	PX120	PX059 EXT	PX092 EXT
rows	no.	2	2	2	2	2	2	2	2
surface	m^2	0.549	0.909	0.909	0.909	0.909	0.909	0.324	0.549
indoor temp. 24°C, 50% R.H.; water inlet/outlet temperature 80/65°C									
Power (re–heating)	kW	51.6	66.6	78.8	83	85.8	87.5	23.2	42.3
water flow	l/s	0.842	1.085	1.285	1.353	1.399	1.427	0.377	0.69
coil side pressure drops	kPa	1	1	1	1	1	1	1	1
total pressure drops	kPa	37	61	85	94	100	104	8	25

Hot Gas Coil (Digit 13)

DX units for Reheating Mode only

Liebert® PDX can be supplied with a reheating system that uses the heat which is normally transferred to the condenser, thus saving energy.

This system is activated during the dehumidification phase, when the temperature is below its setpoint. A control valve prevents the refrigerant from flowing into the reheat coil when not required. Hot gas reheat is available as an alternative to hot water reheat.

Note: Reheating capacity in F, D, H units could slightly differ from reheating capacity in A, W units.

Tab. 8c – Features of hot gas reheat system at nominal airflow, Premium Fan Module

MODELS U/O A/W/F/D/H		PX041	PX045	PX047	PX051	PX057	PX044	PX054	PX062
rows	no.	2	2	2	2	2	2	2	2
surface	m^2	0.324	0.324	0.549	0.549	0.549	0.549	0.549	0.549
Reheating capacity (Scroll Cooling System) (at 24°C, 50%, condensing temperature 45°C)	kW	26.8	29.6	30.6	35.4	39.4	13.9	17.2	19.5
Reheating capacity (Digital Scroll Cooling System) (at 24°C, 50%, condensing temperature 45°C)	kW	26.5	29.4	32.4	34.7	39.3	14	17.2	19.4

Technical Specifications

MODELS U/O A/W/F/D/H		PX074	PX068	PX082	PX094	PX104	PX059 EXT	PX092 EXT
rows	no.	2	2	2	2	26	2	2
surface	m^2	0.549	0.909	0.909	0.909	0.909	0.324	0.549
Reheating capacity (Scroll Cooling System) (at 24°C, 50%, condensing temperature 45°C)	kW	22.3	20.4	26.5	29.3	33.5	38.5	27.4
Reheating capacity (Digital Scroll Cooling System) (at 24°C, 50%, condensing temperature 45°C)	kW	22.2	20.2	27.2	30.8	32.9	38.4	27.2

Tab. 8d — Reheating mode during the dehumidification

First step	Hot gas reheat
Second step	Hot gas reheat + Heaters first step
Third step	Hot gas reheat + Heaters total

Air filters

Removable filters are installed inside the unit before heat exchanger and fans. The F5 standard filters made by paper material and are completely recyclable. Additional high efficiency filters F6, F7 are available as optional. For complete details about filter sections see chapter 9.

Dual Power Supply (Digit 17)

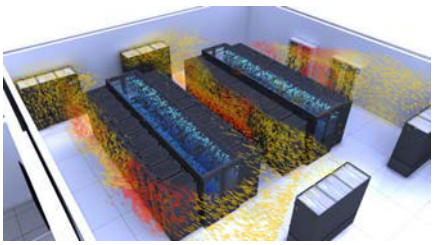
Liebert® PDX offers as option the possibility to have dual power supplies in order to have the units up and running once the main power supply fails.

Liebert® PDX allows choosing between 3 different solutions:

- **Dual Power Supply Parallel**
  2 separate power supplies: during normal working mode both are present, during emergency situation only the main one. This means that during emergency mode ventilation redundancy is granted disabling heating, humidifying and compressor power input. This last option allows during emergency mode to reduce unit power absorption and therefore Genset or UPS sizes.
- **Dual Power Supply Alternate**
  2 separate power supplies: each power supply is able to completely feed the unit. (ATS) Alternate Transfer Switch makes the switch in case of main line failure. In case of failure of the main supply the unit automatically switches to the second power supply. This allows to have a complete power supply redundancy or in case needed to have during emergency mode full cooling redundancy disabling heating and humidifying. This last option allows during emergency mode to reduce unit power absorption and therefore Genset or UPS sizes.
  The solution allows having the following benefits:
  - possibility to have together Automatic or Manual changeover.
  - transfer switching time between power A and power B 1,2-1,5sec.
- **Dual Power Supply Alternate Premium Version with UPS for iCOM board**
  The switch between one power supply and the other makes the units restarting as it pass through the off position. The solution with iCOM Control kept alive under UPS allows the control of the unit to stay powered. This means that the unit is not rebooting and so immediately ready again to cool the room.
  The solution with integrated UPS for the iCOM Control keeps iCOM alive for xx minutes, so even if both power supplies are missing this allow a unit to be ready to continue working once one of the two will come back.

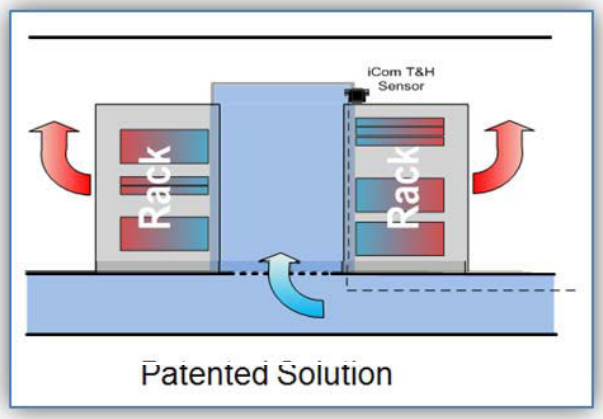
Smart Aisle™ Solution (Digit 18)

To drastically reduce the energy consumption and thus truly optimize the investment in the installation, Emerson Network Power offers the solution that will exactly adjust the cooling capacity to the needs of the servers. This solution includes the separation of the cold and hot zone through a cold aisle, or hot aisle, containment.
This allows the cooling units to operate with higher air temperature therefore increasing both capacity and efficiency.
The solution is designed to have the latest cooling unit (compressor modulating technology with digital scroll, EC fan, Electronic Expansion Valve) with the best control for the Data Center application and well optimized distribution of the air and of the temperatures.
The proposal consists of precision control of temperature, humidity and air flow rate at the server level to ensure exactly the airflow required by the server at the conditions they need to produce maximum life and highest reliability.



The solution is Smart Aisle™ control for the cold aisle containment, Digital Air cooled modulating compressor in a unit with EC Fan to have all the best technologies in the market controlled in the most efficient way.
Liebert® PDX as part of Smart Aisle™ cooling solution is the best answer to ensure the right cooling minimizing the cooling operating costs.
The Liebert® PDX Smart Aisle™ comes with return and supply sensors, remote sensors as well as ready to drive a damper to aeraulically insulate the units not working and a button to force the unit on full cooling for emergency situations.

Emerson Network Power's cold aisle containment solution can achieve an energy saving of up to 65% higher than other manufacturers' cooling units with standard technology.



The unit will drive the compressor(s) based on the supply temperature, while the airflow will be driven based upon the patented control method on the remote temperature and humidity sensors installed on the calibrated holes of the Smart Aisle™.

This allows equalizing the pressures within inside and outside the closed aisle and therefore matching exactly the airflow required by the servers. This means higher availability for the servers' equipment that will be working with the right airflow and the right temperature and minimum power consumption as the unit will not waste any single watt on not needed cooling.

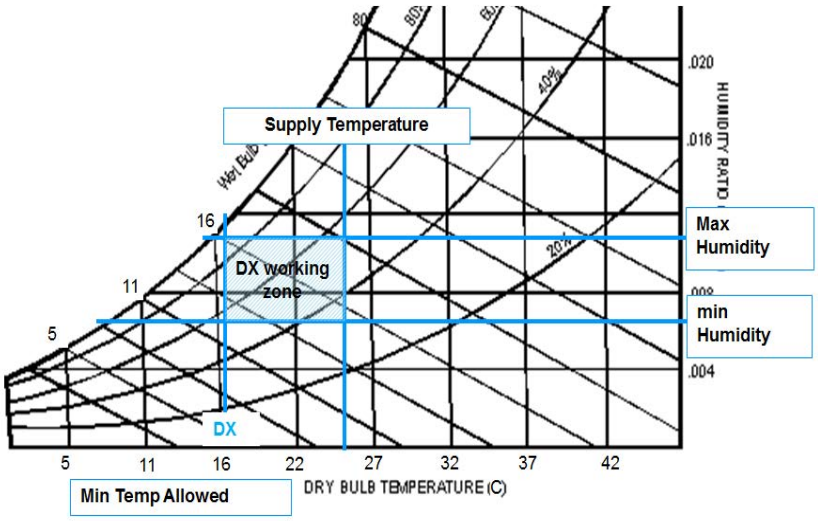
Fig. 8.c Remote temperature and humidity sensor)

Liebert® ECONOMIZER Solution (Digit 18)

The usage of direct freecooling is more and more common on Data Center applications. Compared to other applications the Data Center application still marks a difference on the usage of the Direct Freecooling. The discriminating factor is the humidity control.
In fact, the solution with the direct Freecooling can be limited not only by the temperatures outside but in particular by the humidity levels. Dry Air can absorb different quantities of vapor depending

on its temperature. At a given temperature there is a maximum quantity of grams of vapour by each kilogram that can be taken by the air. More vapour would become solid as liquid water. Given a specific condition the air will have a temperature and a quantity of humidity (this is defined as absolute humidity). If we compare this level of humidity with the maximum level that the air at that temperature can absorb we have the relative humidity. (This from a logic point of view on the physics: Relative humidity is the ratio of the partial pressure of water vapor in an air—water mixture to the saturated vapor pressure of water at a prescribed temperature – wikipedia).
As example: at 18°C the maximum level of humidity is 12,89 g/kg. In case of 18°C 50% the absolute humidity is 6.38 g/kg.
The hotter is the air the more humidity it can absorb.
These rules are clearly represented on the physics using the psychrometric chart that is presenting the different conditions of temperature and humidity at the pressure of sea level.
The behaviour of fresh air freecooling is strongly linked to these physic rules. In fact during winter time the air is cold and when is cold it can have a maximum humidity which is extremely low. (As example at 5°C the maximum level of humidity is already below the ASHRAE recommended limit and as matter of comparison it corresponds to same absolute humidity that you have at 24°C 28%). Therefore in such times you enter in the Data Center very dry air thus requiring the use of the humidifier (element with high energy consumption) in compensation.
Similarly, in wet periods in the spring / autumn, the risk is opposite, that you enter in the data center air that requires dehumidification. (As example air condition of 15°C 100% typical foggy condition corresponds to the absolute humidity level that you have at 24°C 80%).
An efficient control for data centers is then what gives you the possibility to set limits that allow you to choose whether or not to use the outside air to avoid using it when energy is not convenient.
This is **Liebert® Economizer**. It allows setting limits in terms of both temperature and humidity and use the air only when it makes sense from all energy points of view.

Fig. 8.d Sample of settable Economizer working range



So Emerson Network Power proposes a complete solution of direct freecooling specifically thought and developed to address data center needs.
The solution includes in the unit Return and Supply temperature sensors, an external temperature and humidity sensor to check external absolute humidity and solution to correctly drive the dampers installed in a plenum above the unit for the mixing of the external and return air.
iCOM control therefore if external temperature and humidity are within the correct range allows the direct freecooling and complete the required acting the compressors. For digital scroll there is the great opportunity to exploit the modulation capacity to always provide exactly what is needed in terms of modulation.
Whenever the cooling from outside is enough to fully cool the room, the unit will work on pure freecooling mode.
The solution is therefore optimizing to provide the highest saving and the biggest availability thanks to the full Direct Expansion back up provided by the compressor(s).

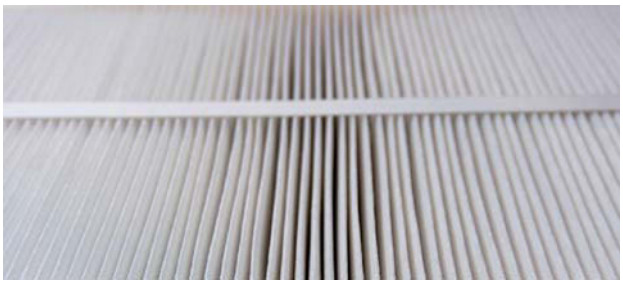
9 Filter section

Standard filters

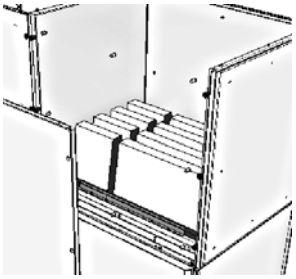
Removable filters are installed inside the unit before fan and heat exchanger.

The standard filtration grade is F5 (CEN EN779 – respectively corresponding to EU5 according to Eurovent EU4/5).

The filter pleated structure gives high filtration efficiency, low pressure drop and permit to use the filter without metallic or
cardboard frame. The filter media is composed by fibre and latex.



High efficiency filters (accessory)

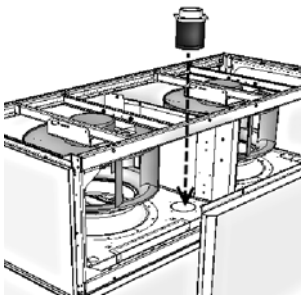


An optional extension hood with high efficiency filters is available, filtration class F6, F7 and F9 in accordance with the CEN EN 779 standard, are made of fibreglass filter media. The filters are placed in "V" sections with a solid external frame in polypropylene, and can withstand remarkable pressure and flow variations. These filters will be installed within an additional duct on the unit top.
The additional pressure drop in comparison with F5 sdt filters are indicated in the following graphs (Tab 8c–h). For dimensions see Fig. 12.a.

Clogged filter alarm (Digit 14)

A differential static pressure gauge after and before the filter gives a signal when the filter is dirty.

Fresh air kit (accessory)



The fresh air kit, optional, has a G3 class filter installed on the intake side of the fan and is connected to the unit with a 100 mm diameter plastic duct. As the fresh air intake is positioned close to the fan suction, it will easily mix the fresh air with the recirculation air.

Air Filters general information

Recently new test methods and configuration systems have been developed for all type of filters. In Europe, CEN is working to establish common standards, in the United States ASHRAE Standards has been in use since 1968 and replaced by ANSI/ASHRAE 52.1–1992. So, in order to have a reference about different standards, see Tab. 9a and Tab 9b. There is no perfect correspondence between different standards, due to the different test methods, but the tables can be used as general guide.

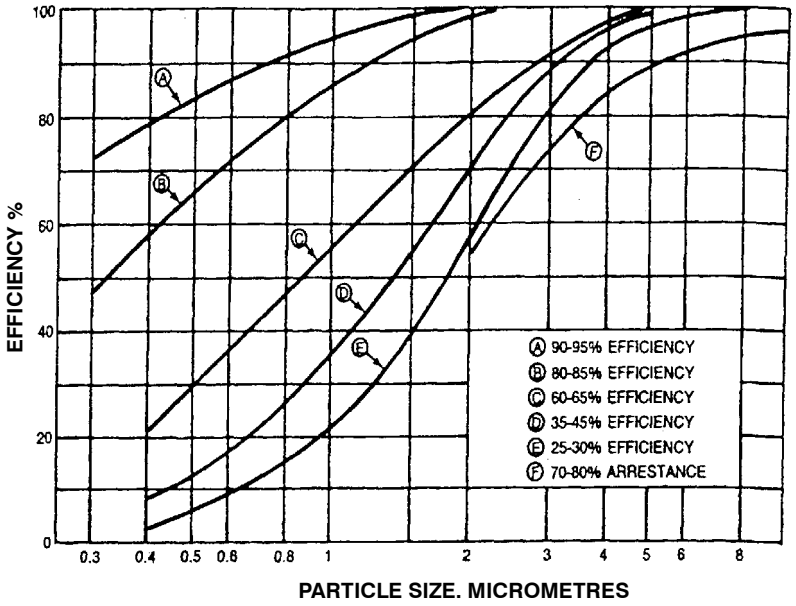
Filter section

Tab. 9a – Comparison between air filter tests

Eurovent 4/9	EN 779 EN 1882	Average Arrestance * [ASHRAE Standard 52.1–1992]		Average Dust Spot Efficiency ** [ASHRAE Standard 52.1–1992]		Minimum Efficiency Reporting Value [ASHRAE 52.2–1999]
		[greater then or equal to]	[less than]	[greater than or equal to]	[less than]	
EU1	G1	60%	65%		20%	1–4
EU2	G2	65%	80%	20%		4
EU3	G3	80%	90%	20%		5
EU4	G4	90%	95%	20%	30%	6–7–8
EU5	F5	95%	98%	40%	60%	8–9–10
EU6	F6	99%		60%	80%	10–11–12–13
EU7	F7	99%		80%	90%	13–14
EU8	F8	99%		90%	95%	14–15
EU9	F9	99%		95%		15

* *Achieved filtering performance in accordance to gravimetric test method on a specific sample of dust.*
** *Achieved filtering performance in accordance to a light transmission test methods, with natural atmospheric dust.*

Tab. 9b – Approximate efficiency versus particle size for typical air filters

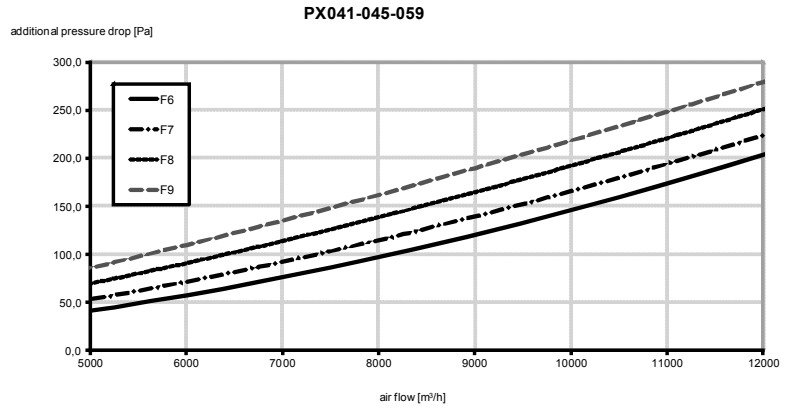


Curves are approximation for general guidance only. Efficiency and arrestance per ASHRAE Std 52.1 test method [From ASHRAE Handbook, HVAC Systems and Equipment].

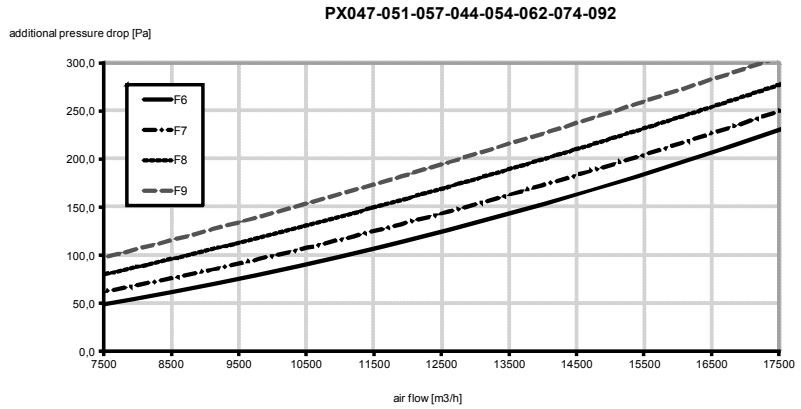
Filter section

High efficiency filters additional pressure drop

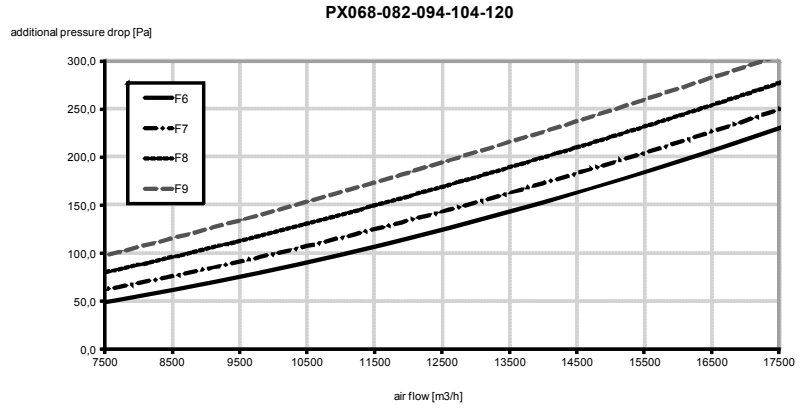
Tab. 9c – Units PX041–045–059: additional pressure drop high efficiency filter.



Tab. 9d – Units PX047–051–057–044–054–062–074–092: additional pressure drop high efficiency filter.



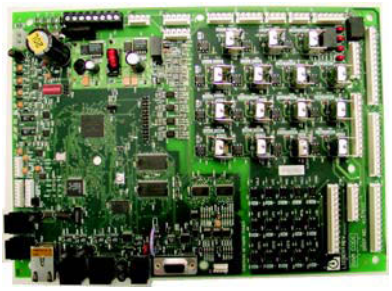
Tab. 9e – Units PX068–082–094–104–120: additional pressure drop high efficiency filter.



10 Microprocessor Controls

iCOM Control

Fig. 10.a



Liebert® PDX models are controlled by iCOM Large board.

The control handles the operation of the Liebert® PDX units with a special control algorithm, ensuring top reliability and maximum efficiency.
The iCOM Large board (main board) is housed in the electrical panel and it could be connected to a remote display (supplied on request), to be installed in the container/room.

- The 3 digit user interface is an inner display that permits an easy access to the unit parameters. Writing access is protected by a password. It features navigation push-buttons and status leds.
  As optional is possible to have a large display that allows more functions and a more accurate monitoring (see paragraph CDL Graphic Display). Warnings and alarms activate a visual indicator and buzzer. All settings are protected through a 3-Level password system.
- Input for Remote unit On—Off and free contacts for simple remote monitoring of warnings and alarms are available.
- LAN management: functions provided as standard include stand—by (in case of failure or overload of the unit in operation, the second one starts automatically), automatic rotation, and cascade (division of the load among several units, through split of the proportional band).
- Automatic restart is provided after a power failure.

Tab. 10a — Technical Data iCOM

Technical Data	iCOM Large
E2prom	4Mbit + 512kbit
Flash memory	32Mbit
RAM memory	128Mbit
Microcontroller	Coldfire 32Mbit
Analogue Input	4 x 0—10V,0—5V,4..20mA (selectable) + 2 PTC/NTC + 2 NTC
Digital Input	15 x opto—coupled
Analogue Output	4 x 0—10V
Digital Output	15 triacs output and 2 relay output
Time and date	Buffered by an LI-battery
Hirobus Lan connectors	2 RJ45 sockets (for unit in LAN, remote display)
Ethernet network connectors	1 RJ45 socket
CAN bus connectors	2 RJ12 sockets
Hironet connectors	1 RJ9 socket for RS485 (direct connection to proprietary supervision)
RS232 service port	1 db9 socket

CDL Graphic Display (option)

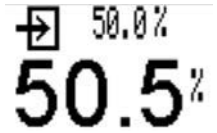
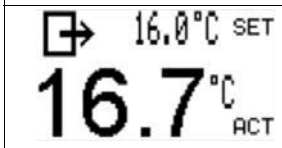
Featuring up to 16 days record of controlled parameters as well as the last 400 events occurred.

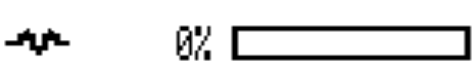
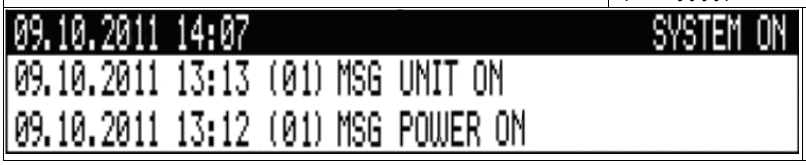
- Large graphic display (320 x 240 pixel).
- System Window: system operation status at a glance.
- Self−explanatory Icons: they are used for the Menu−Layout of the CDL iCOM. There are 3 iCOM menus: user, service and advanced.
- Online Help: Every single parameter has its own multi−page explanation.
- Status Report of the latest 400 event−messages of the unit/system.
- Four different Graphic Data Records.
- Semi or Full Manual Mode software management including all safety devices.
- 3−Level Passwords system to protect all the settings.
- Ergonomic design for use also as portable device (start−up and ”flying connections” by service personnel).
- Multi−language menu with on−the−fly language selection.

Technical Data CDL Graphic Display

- Microcontroller: . . . . . Coldfire 32bit
- Time and date function buffered by LI−battery
- Ethernet network connectors . . . . . 1 RJ45 sockets (for unit in LAN, remote display)
- CAN bus connectors . . . . . 2 RJ12 sockets
- Power supply: . . . . . via CAN bus or external 12Vdc supply

Microprocessor Controls

	Return air temperature. If on the top—right SYSTEM is indicated, it is the average of all units with system on. If UNIT x is indicated, it is the return air temperature of the specific unit. This is valid for all indications in the display. The small number represents the actual set point. If the “Cold Aisle” function is enabled the remote THB sensor temperature value is shown in place of the standard share return temperature. Specific Cold Aisle icons are shown.
	Return air humidity of the system / the unit and the set point. If the “Cold Aisle” function is enabled the remote THB sensor humidity value is shown in place of the standard share return humidity. Specific Cold Aisle icons are shown.
	Supply air temperature of the system / the unit and the supply limit set point. SET means set point ACT means actual reading

	This bargraph gives information about the actual Fan speed. In units w/o Fan speed control the graph will show 100% if the fan is on, and 0% if the fan is off.
	This bargraph gives information about the actual used cooling resources in operation, either for the system or for a specific unit.
	This bargraph gives information about the actual used Freecooling resources in operation, either for the system or for a specific unit.
	This bargraph gives information about the actual used heating resources (Hot Water) in operation, either for the system or for a specific unit.
	This bargraph gives information about the actual used heating resources (Electrical Heaters) in operation, either for the system or for a specific unit.
	This bargraph gives information about the actual used dehumidification resources in operation, either for the system or for a specific unit.
	This bargraph gives information about the actual used humidification resources in operation, either for the system or for a specific unit.
	This bargraph gives information about the next maintenance time (mm-yyyy).
	This field of the window informs about time, date, the status of the system / unit. It also contains an event log holding the 2 latest events occurred to the system / unit. (Large CF Display only).

Liebert IntelliSlot® Web, 485, SiteLink—E, IPBML cards (Digit 19)

Liebert IntelliSlot® Web, 485, SiteLink—E, IPBML cards enable monitoring through Liebert Supervising SW tools (SiteScan, Nform) or a Building Management System.
Plug and play solution cards that allow live data management, remote alarm notification and offer multiple connection options. Moreover provide for ease of integration with industry standard “open” protocol.

Alarm Board (accessory)

The Alarm Board converts Alarms (high priority) or Warnings (lower priority) from iCOM into Volt—free contacts. In this way, following Warnings/Alarms are separated: Humidifier Failure (if installed), High/Low room Temperature, High/Low room Humidity, Fan Failure, Clogged Filter alarm (if device installed), Water Leakage (if sensor installed). Alarm board is included for free in case Electronic Expansion Valve (selected on unit digit) and standard software. In fact iCOM can use the same board as double function for this application.

11 Humidification

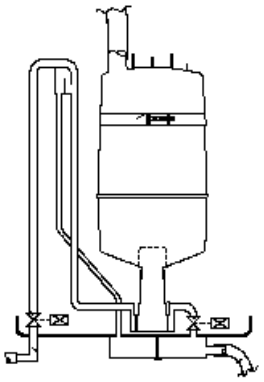
The **humidification system** is provided by an electronic controlled humidifier. The **dehumidification function**, which is supplied as standard when the humidifier option is installed, acts by reducing the fan speed with consequent reduction of the air flow and at the same time switching on the compressor(s).

Electronic humidity control

The software of the iCom Control microprocessor control includes an algorithm which manages the humidifier modulating and also provides the dehumidification function. There is also a special function which automatically prevents dehumidification if the return air temperature is below the required value. When the temperature reaches the correct value, the dehumidification function is automatically reactivated. Dehumidification control may be either of the proportional or of the on–off type, depending on the installation requirements: on–off is set as standard at the factory.

Electrode steam humidifier

The Electrode humidifier is a replaceable plastic water cylinder with immersed electrodes. When an electrical current passes between the electrodes, the water is converted into the required quantity of steam. It is suitable for a large range of water qualities (with varying degrees of hardness) with the exception of demineralized water. It almost instantaneously produces clean, particle–free steam and avoids energy losses which are typical of other systems. The humidifier is provided with the steam cylinder, water inlet and outlet valves and a maximum level sensor. The steam output can be adjusted within a range of values which can be chosen manually and is factory–set at 50% of the maximum capacity (see the relevant data in Tab. 11a).



Electrode humidifier features

The steam is mixed with the delivery air of the evaporating coil by means of a suitable distributor. The iCom Control controller can determine when the cylinder has to be changed. Replacing the cylinder is extremely easy and quick. A self–adaptive flow control system is fitted as standard and controls the current passing through the cylinder water.

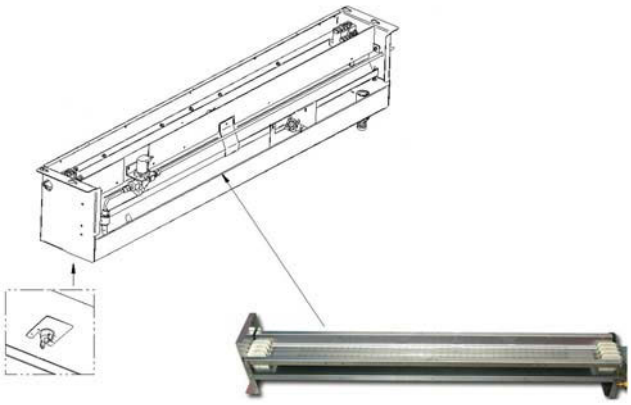
Tab. 11a – Humidair specifications

MAIN POWER SUPPLIES (V ± 10%)	SETTING	ABSORBED CURRENT	POWER	MAX. CYLINDER WATER VOLUME	MAX. SUPPLY WATER QUANTITY	MAX. DRAIN WATER QUANTITY
	[kg/h] *	[A]	[kW]	[l]	[l/min.]	[l/min.]
400V / 3ph / 50Hz	2.7...13.0	13.0	9.0	5.5	0.6	10.0

For humidifier current (FLA) and rated power refer to electrical features in air conditioner manual.
(*) Unit is factory–set to produce about 50% of the maximum value (see iCom Control manual).

Humidification

Infrared humidifier



The infrared humidifier design consists of quartz lamps mounted above a stainless steel water reservoir. The lamps never come in contact with the water. When humidification of room air is required, infrared rays generate water vapor—without impurities or odor, within seconds.

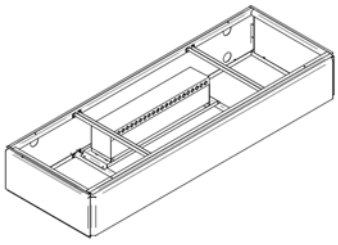
Infrared humidifier features

The steam is mixed with the delivery air of the cooling coil by means of a suitable distributor.
During normal humidifier operation, deposits of mineral solids will collect in the humidifier pan and on the float switch. These must be cleaned periodically to ensure proper operation. Frequency of cleaning must be locally established because it depends on humidifier usage and local water quality. A spare pan is recommended to reduce maintenance time at unit. The Liebert autoflush system can greatly increase the time between cleanings, but does not eliminate the need for periodic checks and maintenance.

Tab. 11b — Infrared Humidifier specifications

Humidifier Model	PAN	MAIN POWER SUPPLIES (V ± 10%)	NOMINAL CAPACITY [kg/h]	ABSORBED CURRENT [A]	POWER INPUT [kW]
PX041-045-059	Stainless steel Acciaio inossidabile	400V / 3ph / 50Hz	5	6.4	4.8
PX047...120	Stainless steel Acciaio inossidabile	400V / 3ph / 50Hz	10	13.9	9.6

Ultrasonic humidifier



Ultrasonic humidifier operates on the principle of ultrasonic nebulization.
The mist generated in the water tank by means of the transducer is blown into the room by the built-in fan.
Ultrasonic Humidifier can work only with demineralized water with conductivity < 5 µS/cm (up to 20 µS/cm for a short time).

Ultrasonic humidifier features

The Ultrasonic humidifier is supplied mounted within one base module 400 mm heigh stand alone, to connect on the field with the air conditioner.
The module can be installed on the raised floor or in the raised floor.
The humidifier consists of nebulization modules, solenoid valve for the control of the supply water, float switch and a case that houses the fan.

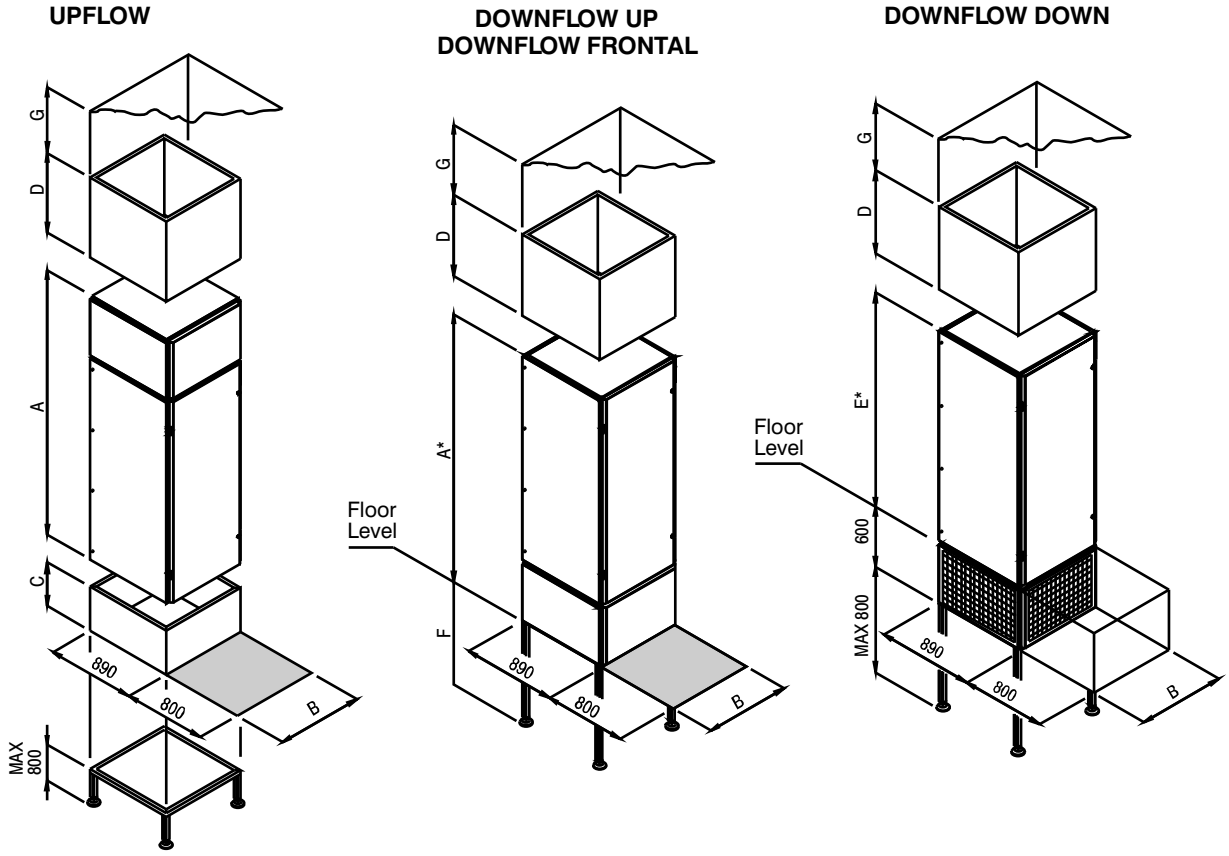
Tab. 11c — Ultrasonic Humidifier specifications

Humidifier Model	POWER SUPPLIES (Vac)	[kg/h]	NUMBER OF TRANSDUCERS	[W]
HSU08RM000	48	0…6.0	16	670

12 Dimensional Data / Connections

Overall dimensions and service area

Fig. 12.a



Tab. 12a — Overall dimensions - Service area (referring to Fig. 12.a)

Models	B [mm]	Unit Upflow Downflow Up Downflow Frontal A* [mm]	Downflow Down E* [mm]	Options AVAILABLE PLENUM HEIGHTS: D [mm] Plenum	Plenum for silencing cartridges	Plenum for high efficiency filters	Plenum with frontal airflow (Upflow)	Air Economizer	Base Modules C [mm]
PX041	1200	1970*	1370*	500–600–700–800–900	600–900	600–900	600	850	200 Base Module (Base Module with bottom air intake) 600 (Base Module with rear air intake)
PX045									
PX047	1750								
PX051									
PX057									
PX044									
PX054									
PX062									
PX074									
PX068	2550								
PX082									
PX094									
PX104									
PX120									
PX059	1200	2570*	1970*						
PX092	1750								

F (free space between unit bottom and basement): max. 800 mm (base frame/legs kit availability)
min. 600mm (to get declared performances)
min. 300mm (minimum working conditions)

G (free space between ceiling and unit top or plenum top if installed): min. 600mm (to get declared performances)
min. 300mm (minimum working conditions)

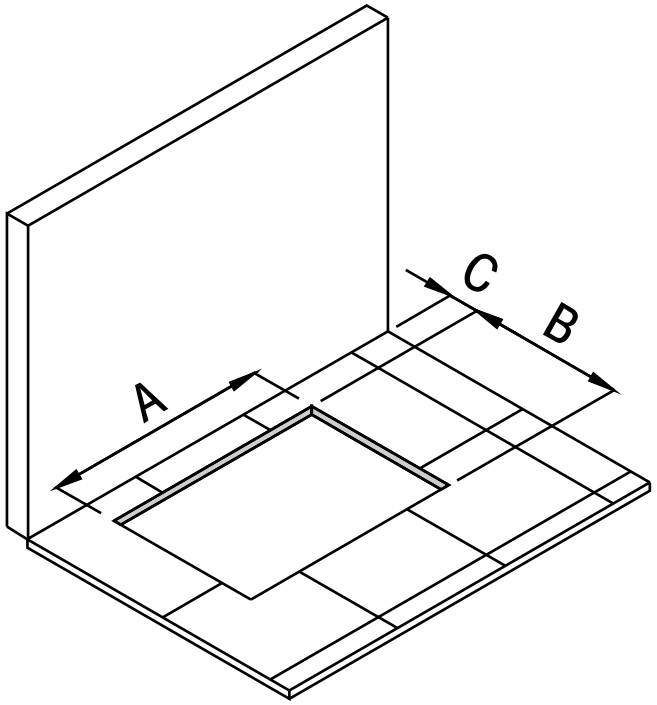
***** In Downflow Up, Downflow Frontal, Downflow Down units with predisposition for damper, economizer and plenum installation (digit 18=S, F, G, H or L) the unit is shipped with a connecting flange 50 mm high fixed on the unit top, so the unit is 50 mm higher. If required, the flange can be removed by unscrewing the fixing screws (removing the side panel to access the screws head) and repositioned later (see Chap. 14).

Dimensional Data / Connections

Hole in the floor for Downflow versions.

Fig. 12.b

Downflow Up
Downflow Down



Tab. 12b — Hole in the floor for Downflow units, dimensions in mm.

Configuration	Unit		PX041 PX045 PX059	PX047 PX051 PX057 PX044 PX054 PX062 PX074 PX092	PX068 PX082 PX094 PX104 PX120
Downflow Up		A	1100	1650	2450
		B	760	760	760
		C*	70	70	70
	With Base Frame **	A	1176	1726	2526
		B	840	840	840
		C*	30	30	30
	With Legs kit **	A	1156	1706	2506
		B	820	820	820
		C*	30	30	30
Downflow Down		A	1182	1732	2532
		B	846	846	846
		C*	20	20	20
	With floor tiles support kit **	A	1220	1770	2570
		B	885	885	885
		C*	50	50	50

* *Minimal distance of the working unit from the back wall. Caution: In order to assemble and/or install accessories, a larger distance might be required. In that case, the unit can be moved in the working position after installation / assembly procedures.*
** *Optional accessories — see details in Chap. 14*

Units Weight

Tab. 12c — Units weight

MODELS	A [kg]	W [kg]	F [kg]	D [kg]	H [kg]	Packaging (kg)
Standard Height unit						
PX041	452	466	521	507	521	23
PX045	456	470				23
PX047	620 (635)	635 (650)	727 (742)	712 (727)	727 (742)	28
PX051	621 (637)	636 (652)	728 (744)	713 (697)	728 (744)	28
PX057	675	692				28
PX044	638	657	747	725	744	28
PX054	642	663	751	727	748	28
PX062	680	703	790	764	787	28
PX074	680	706				28
PX068	887	910	1006	971	1001	42
PX082	891 (931)	920 (960)	1010 (1050)	975 (1015)	1005 (1045)	42
PX094	899 (929)	928 (958)	1022 (1052)	987 (1017)	1017 (1047)	42
PX104	901 (931)	930 (963)	1024 (1057)	989 (1022)	1019 (1052)	42
PX120	954	989				42
Extended Height unit [Coil Module] (1)						
PX059	461	478				23
PX092	576	605				28
Extended Height unit [Fan Base Frame] (1)						
BF121	91					26
BF176	150					35
Extended Height unit [Fan Base Module / Fan Top Plenum] (1)						
BM/ TP 121	132					26
BM/ TP 176	200					35

Note:
Data above refer to standard units without any option. Data in brackets refer to Digital Scroll Compressor Cooling System, when the data differs.

(1) *For Extended Height total unit weight must be calculated summing the Coil Module weight and Fan Section weight.*

Packing

The air conditioners are packed on a wooden pallet (1), with shockproof angle pieces from pressed cardboard (2, 3, 4, 5), panels in cardboard (6, 7) and flexible polythene film (8).
Base frames are packed on a wooden pallet (1), with a panel in cardboard (6) and a protective wooden structure (9).

Special packing (options)

Special packing for sea transport, consisting of a wooden box or crate, can be supplied on request.

Fig. 12.c Packing of unit

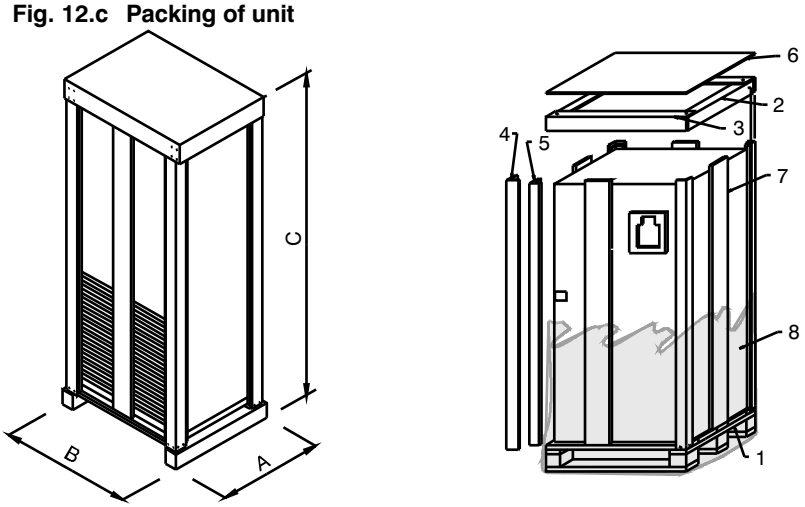
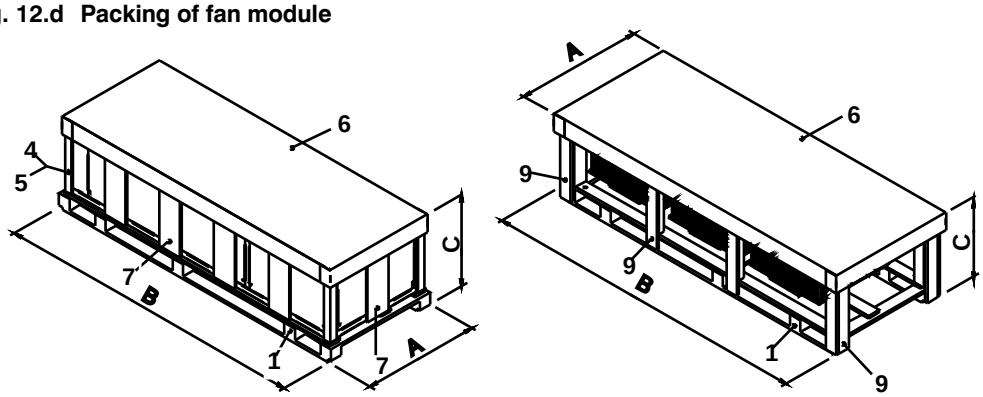


Fig. 12.d Packing of fan module



Tab. 12d – Packing dimensions

Standard Height Unit	Extended Height Unit [Coil Module]	A [mm]	B[mm]	C[mm]
PX041 PX045	PX059	960	1280	2170
PX047 PX051 PX057 PX044 PX054 PX062 PX074	PX092	960	1830	2170
PX068 PX082 PX094 PX104 PX120	–	960	2630	2170
	Extended Height Unit [Fan Module]	**A [mm]**	**B[mm]**	**C[mm]**
	BM/ TP/BF121	960	1280	800
	BM/ TP/BF176	960	1830	800

Dimensional Data / Connections

Hydraulic and electrical connections – Downflow version

Tab. 12e — Refrigerant , hydraulic and electrical connections

Model		PX041					PX045		PX059	
Unit Connection		A	W	F	D	H	A	W	A	W
IL1	Refrigerant liquid line inlet 1*	O.D. Ø18 mm			O.D. Ø18 mm		O.D. Ø18 mm		O.D. Ø18 mm	
IL2	Refrigerant liquid line inlet 2*									
OG1	Refrigerant gas line outtlet 1*	O.D. Ø22 mm			O.D. Ø22 mm		O.D. Ø22 mm		O.D. Ø22 mm	
OG2	Refrigerant gas line outlet 2 *									
IWC1	Water to condenser 1 inlet		Rp 1 ¼ ISO 7/1			Rp 1 ¼ ISO 7/1		Rp 1 ¼ ISO 7/1		Rp 1 ¼ ISO 7/1
IWC2	Water to condenser 2 inlet									
OWC1	Water to condenser 1 outlet		Rp 1 ¼ ISO 7/1			Rp 1 ¼ ISO 7/1		Rp 1 ¼ ISO 7/1		Rp 1 ¼ ISO 7/1
OWC2	Water to condenser 2 outlet									
IHW	Hot water inlet	OD 22 mm								
OHW	Hot water outlet	OD 22 mm								
IFC	Water inlet (Freecooling and dual fluid)			Rp 1 ¼ ISO 7/1						
OFC	Water outlet (Freecooling and dual fluid)			Rp 1 ¼ ISO 7/1						
CD	Condensate drain	I.D. Ø20 [mm]								
HF1	Humidifier feed	R ½ - ISO 7/1 (Electrode Humidifier)								
HF2	Humidifier feed	O.D. 6 [mm] (Infrared Humidifier)								
HD1	Humidifier drain	I.D. Ø32 [mm] (Electrode Humidifier)								
HD2	Humidifier drain	I.D. Ø22 [mm] (Infrared Humidifier)								
EC	Electrical power supply	Ø 48 [mm]								
EC aux	Low voltage cables	Ø 40 - Ø 36 [mm]								

Model		PX047					PX051					PX057	
Unit Connection		A	W	F	D	H	A	W	F	D	H	A	W
IL1	Refrigerant liquid line inlet 1*	O.D. Ø18 mm			O.D. Ø18 mm		O.D. Ø18 mm			O.D. Ø18 mm		O.D. Ø18 mm	
IL2	Refrigerant liquid line inlet 2*												
OG1	Refrigerant gas line outtlet 1*	O.D. Ø22 mm			O.D. Ø22 mm		O.D. Ø22 mm			O.D. Ø22 mm		O.D. Ø22 mm	
OG2	Refrigerant gas line outlet 2 *												
IWC1	Water to condenser 1 inlet		Rp 1 ¼ ISO 7/1			Rp 1 ¼ ISO 7/1		Rp 1 ¼ ISO 7/1			Rp 1 ¼ ISO 7/1		Rp 1 ¼ ISO 7/1
IWC2	Water to condenser 2 inlet												
OWC1	Water to condenser 1 outlet		Rp 1 ¼ ISO 7/1			Rp 1 ¼ ISO 7/1		Rp 1 ¼ ISO 7/1			Rp 1 ¼ ISO 7/1		Rp 1 ¼ ISO 7/1
OWC2	Water to condenser 2 outlet												
IHW	Hot water inlet	OD 22 mm											
OHW	Hot water outlet	OD 22 mm											
IFC	Water inlet (Freecooling and dual fluid)			Rp 1 ½ ISO 7/1					Rp 1 ½ ISO 7/1				
OFC	Water outlet (Freecooling and dual fluid)			Rp 1 ½ ISO 7/1					Rp 1 ½ ISO 7/1				
CD	Condensate drain	I.D. Ø20 [mm]											
HF	Humidifier feed	R ½ - ISO 7/1 (Electrode Humidifier), O.D. 6 [mm] (Infrared Humidifier)											
HD	Humidifier drain	I.D. Ø32 [mm] (Electrode Humidifier), I.D. Ø22 [mm] (Infrared Humidifier)											
EC	Electrical power supply	Ø 48 [mm]											
EC aux	Low voltage cables	Ø 40 - Ø 36 [mm]											

**** Connection size only. The connecting pipe diameter depends on unit model, see Tab.d in par. 5.1.2 (User Manual)***
***** VICTAULIC® Connection.***
****** Optional. Threaded union on request***

Dimensional Data / Connections

Model		PX044					PX054					PX062				
Unit Connection		A	W	F	D	H	A	W	F	D	H	A	W	F	D	H
IL1	Refrigerant liquid line inlet 1*	O.D. Ø18 mm			O.D. Ø18 mm		O.D. Ø18 mm			O.D. Ø18 mm		O.D. Ø18 mm			O.D. Ø18 mm	
IL2	Refrigerant liquid line inlet 2*	O.D. Ø18 mm			O.D. Ø18 mm		O.D. Ø18 mm			O.D. Ø18 mm		O.D. Ø18 mm			O.D. Ø18 mm	
OG1	Refrigerant gas line outtlet 1*	O.D. Ø18 mm			O.D. Ø18 mm		O.D. Ø18 mm			O.D. Ø18 mm		O.D. Ø18 mm			O.D. Ø18 mm	
OG2	Refrigerant gas line outlet 2 *	O.D. Ø18 mm			O.D. Ø18 mm		O.D. Ø18 mm			O.D. Ø18 mm		O.D. Ø18 mm			O.D. Ø18 mm	
IWC1	Water to condenser 1 inlet		Rp 1 ¼ ISO 7/1			Rp1 ¼ ISO 7/1		Rp1 ¼ ISO 7/1			Rp 1 ¼ ISO 7/1		Rp 1 ¼ ISO 7/1			Rp 1 ¼ ISO 7/1
IWC2	Water to condenser 2 inlet		Rp1 ¼ ISO 7/1			Rp1 ¼ ISO 7/1		Rp1 ¼ ISO 7/1			Rp 1 ¼ ISO 7/1		Rp 1 ¼ ISO 7/1			Rp 1 ¼ ISO 7/1
OWC1	Water to condenser 1 outlet		Rp1 ¼ ISO 7/1			Rp1 ¼ ISO 7/1		Rp1 ¼ ISO 7/1			Rp1 ¼ ISO 7/1		Rp1 ¼ ISO 7/1			Rp1 ¼ ISO 7/1
OWC2	Water to condenser 2 outlet		Rp1 ¼ ISO 7/1			Rp1 ¼ ISO 7/1		Rp1 ¼ ISO 7/1			Rp 1 ¼ ISO 7/1		Rp 1 ¼ ISO 7/1			Rp1 ¼ ISO 7/1
IHW	Hot water inlet	OD 22 mm														
OHW	Hot water outlet	OD 22 mm														
IFC	Water inlet (Freecooling and dual fluid)			Rp 1 ½ ISO 7/1					Rp 1 ½ ISO 7/1					Rp 1 ½ ISO 7/1		
OFC	Water outlet (Freecooling and dual fluid)			Rp 1 ½ ISO 7/1					Rp 1 ½ ISO 7/1					Rp 1 ½ ISO 7/1		
CD	Condensate drain	I.D. Ø20 [mm]														
HF	Humidifier feed	R ½ - ISO 7/1 (Electrode Humidifier), O.D. 6 [mm] (Infrared Humidifier)														
HD	Humidifier drain	I.D. Ø32 [mm] (Electrode Humidifier), I.D. Ø22 [mm] (Infrared Humidifier)														
EC	Electrical power supply	Ø 48 [mm]														
EC aux	Low voltage cables	Ø 40 - Ø 36 [mm]														

Model		PX074		PX092		PX068					PX082				
Unit Connection		A	W	A	W	A	W	F	D	H	A	W	F	D	H
IL1	Refrigerant liquid line inlet 1*	O.D. Ø18 mm		O.D. Ø18 mm		O.D. Ø18 mm			O.D. Ø18 mm		O.D. Ø18 mm			O.D. Ø18 mm	
IL2	Refrigerant liquid line inlet 2*	O.D. Ø18 mm		O.D. Ø18 mm		O.D. Ø18 mm			O.D. Ø18 mm		O.D. Ø18 mm			O.D. Ø18 mm	
OG1	Refrigerant gas line outtlet 1*	O.D. Ø22 mm		O.D. Ø22 mm		O.D. Ø18 mm			O.D. Ø18 mm		O.D. Ø22 mm			O.D. Ø22 mm	
OG2	Refrigerant gas line outlet 2 *	O.D. Ø22 mm		O.D. Ø22 mm		O.D. Ø18 mm			O.D. Ø18 mm		O.D. Ø22 mm			O.D. Ø22 mm	
IWC1	Water to condenser 1 inlet		Rp1 ¼ ISO 7/1		Rp1 ¼ ISO 7/1		Rp1 ¼ ISO 7/1			Rp1 ¼ ISO 7/1		Rp1 ¼ ISO 7/1			Rp1 ¼ ISO 7/1
IWC2	Water to condenser 2 inlet		Rp1 ¼ ISO 7/1		Rp1 ¼ ISO 7/1		Rp1 ¼ ISO 7/1			Rp1 ¼ ISO 7/1		Rp1 ¼ ISO 7/1			Rp1 ¼ ISO 7/1
OWC1	Water to condenser 1 outlet		Rp1 ¼ ISO 7/1		Rp1 ¼ ISO 7/1		Rp1 ¼ ISO 7/1			Rp1 ¼ ISO 7/1		Rp1 ¼ ISO 7/1			Rp1 ¼ ISO 7/1
OWC2	Water to condenser 2 outlet		Rp1 ¼ ISO 7/1		Rp1 ¼ ISO 7/1		Rp1 ¼ ISO 7/1			Rp1 ¼ ISO 7/1		Rp1 ¼ ISO 7/1			Rp1 ¼ ISO 7/1
IHW	Hot water inlet	OD 22 mm													
OHW	Hot water outlet	OD 22 mm													
IFC	Water inlet (Freecooling and dual fluid)							O.D. 54 mm** R 2 - ISO 7/1***					O.D. 54 mm** R 2 - ISO 7/1***		
OFC	Water outlet (Freecooling and dual fluid)							O.D. 54 mm** R 2 - ISO 7/1***					O.D. 54 mm** R 2 - ISO 7/1***		
CD	Condensate drain	I.D. Ø20 [mm]													
HF	Humidifier feed	R ½ - ISO 7/1 (Electrode Humidifier), O.D. 6 [mm] (Infrared Humidifier)													
HD	Humidifier drain	I.D. Ø32 [mm] (Electrode Humidifier), I.D. Ø22 [mm] (Infrared Humidifier)													
EC	Electrical power supply	Ø 48 [mm]													
EC aux	Low voltage cables	Ø 40 - Ø 36 [mm]													

**** Connection size only. The connecting pipe diameter depends on unit model, see Tab.d in par. 5.1.2 (User Manual)***
***** VICTAULIC® Connection.***
****** Optional. Threaded union on request***

Dimensional Data / Connections

Model		PX094					PX104					PX120	
Unit Connection		A	W	F	D	H	A	W	F	D	H	A	W
IL1	Refrigerant liquid line inlet 1*	O.D. Ø18 mm			O.D. Ø18 mm		O.D. Ø18 mm			O.D. Ø18 mm		O.D. Ø18 mm	
IL2	Refrigerant liquid line inlet 2*	O.D. Ø18 mm			O.D. Ø18 mm		O.D. Ø18 mm			O.D. Ø18 mm		O.D. Ø18 mm	
OG1	Refrigerant gas line outtlet 1*	O.D. Ø22 mm			O.D. Ø22 mm		O.D. Ø22 mm			O.D. Ø22 mm		O.D. Ø22 mm	
OG2	Refrigerant gas line outlet 2 *	O.D. Ø22 mm			O.D. Ø22 mm		O.D. Ø22 mm			O.D. Ø22 mm		O.D. Ø28 mm	
IWC1	Water to condenser 1 inlet		Rp 1 ¼ ISO 7/1			Rp 1 ¼ ISO 7/1		Rp 1 ¼ ISO 7/1			Rp 1 ¼ ISO 7/1		Rp 1 ¼ ISO 7/1
IWC2	Water to condenser 2 inlet		Rp 1 ¼ ISO 7/1			Rp 1 ¼ ISO 7/1		Rp 1 ¼ ISO 7/1			Rp 1 ¼ ISO 7/1		Rp 1 ¼ ISO 7/1
OWC1	Water to condenser 1 outlet		Rp 1 ¼ ISO 7/1			Rp 1 ¼ ISO 7/1		Rp 1 ¼ ISO 7/1			Rp 1 ¼ ISO 7/1		Rp 1 ¼ ISO 7/1
OWC2	Water to condenser 2 outlet		Rp 1 ¼ ISO 7/1			Rp 1 ¼ ISO 7/1		Rp 1 ¼ ISO 7/1			Rp 1 ¼ ISO 7/1		Rp 1 ¼ ISO 7/1
IHW	Hot water inlet	OD 22 mm											
OHW	Hot water outlet	OD 22 mm											
IFC	Water inlet (Freecooling and dual fluid)			O.D. 54 mm** R 2 - ISO 7/1***					O.D. 54 mm** R 2 - ISO 7/1***				
OFC	Water outlet (Freecooling and dual fluid)			O.D. 54 mm** R 2 - ISO 7/1***					O.D. 54 mm** R 2 - ISO 7/1***				
CD	Condensate drain	I.D. Ø20 [mm]											
HF	Humidifier feed	R ½ - ISO 7/1 (Electrode Humidifier), O.D. 6 [mm] (Infrared Humidifier)											
HD	Humidifier drain	I.D. Ø32 [mm] (Electrode Humidifier), I.D. Ø22 [mm] (Infrared Humidifier)											
EC	Electrical power supply	Ø 48 [mm]											
EC aux	Low voltage cables	Ø 40 - Ø 36 [mm]											

**** Connection size only. The connecting pipe diameter depends on unit model, see Tab.d in par. 5.1.2 (User Manual)***
***** VICTAULIC® Connection.***
****** Optional. Threaded union on request***

Fig. 12.e Refrigerant, water and electrical connections PX041-045-059 A-W, top view

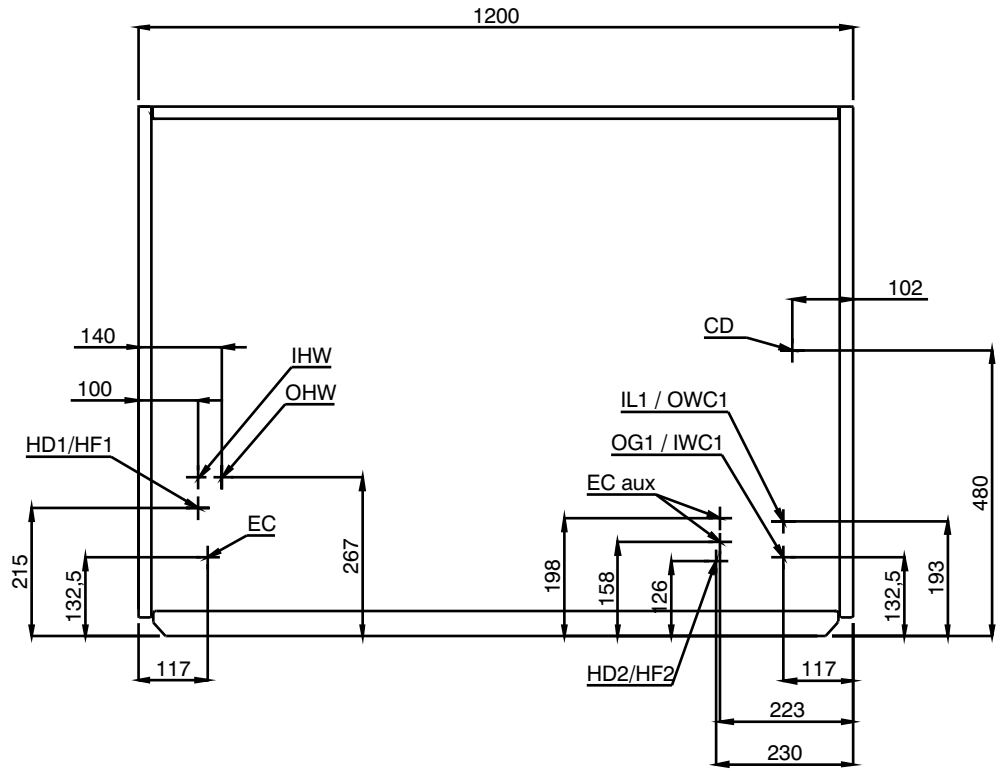


Fig. 12.f Refrigerant, water and electrical connections PX041 F-H-D, top view

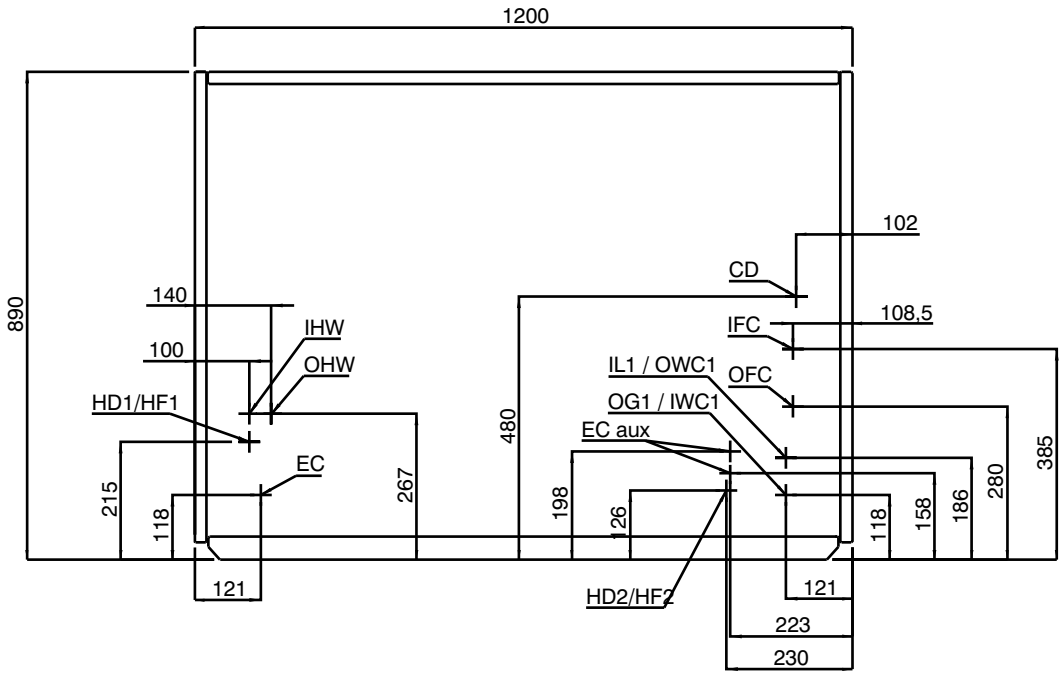


Fig. 12.g Refrigerant, water and electrical connections PX047-051-057-044-054-062-074-092 A-D, top view

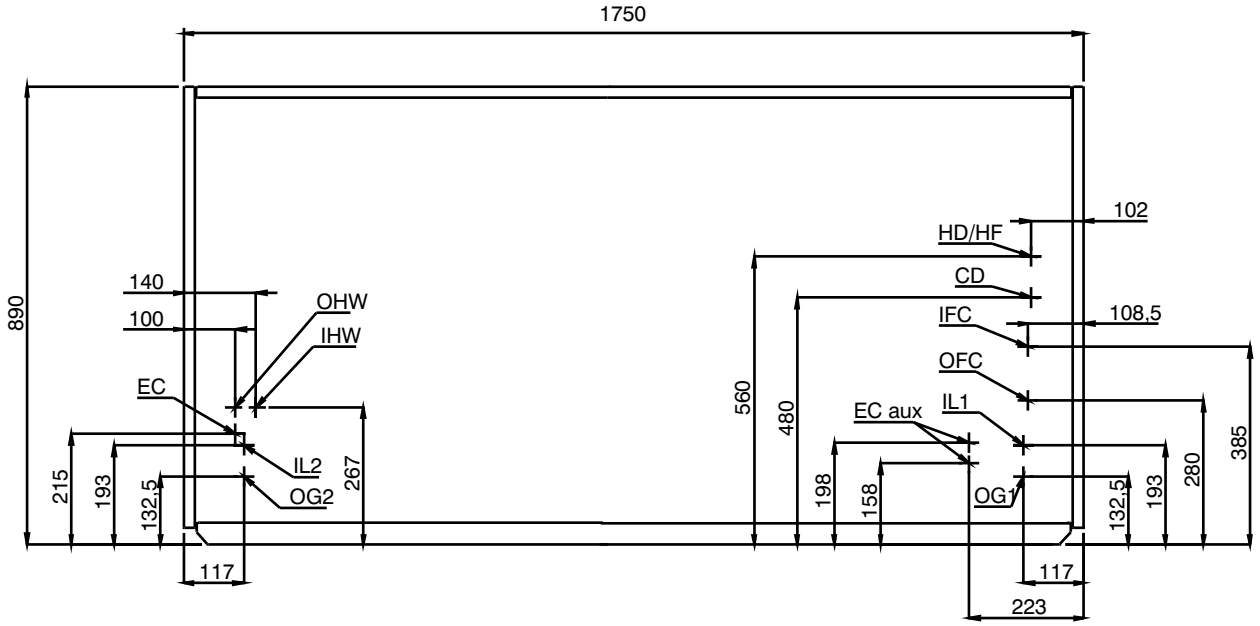


Fig. 12.h Refrigerant, water and electrical connections PX047-051-057-044-054-062-074-092 W-F-H, top view

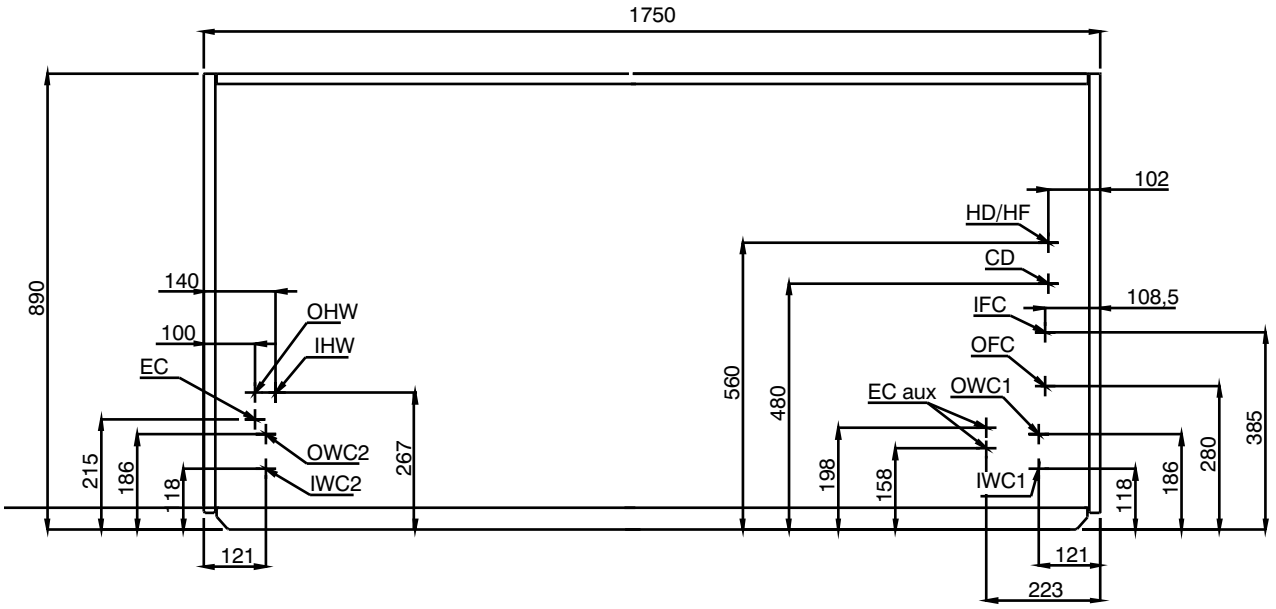


Fig. 12.i Refrigerant, water and electrical connections PX068-082-094-104-120 A-D, top view

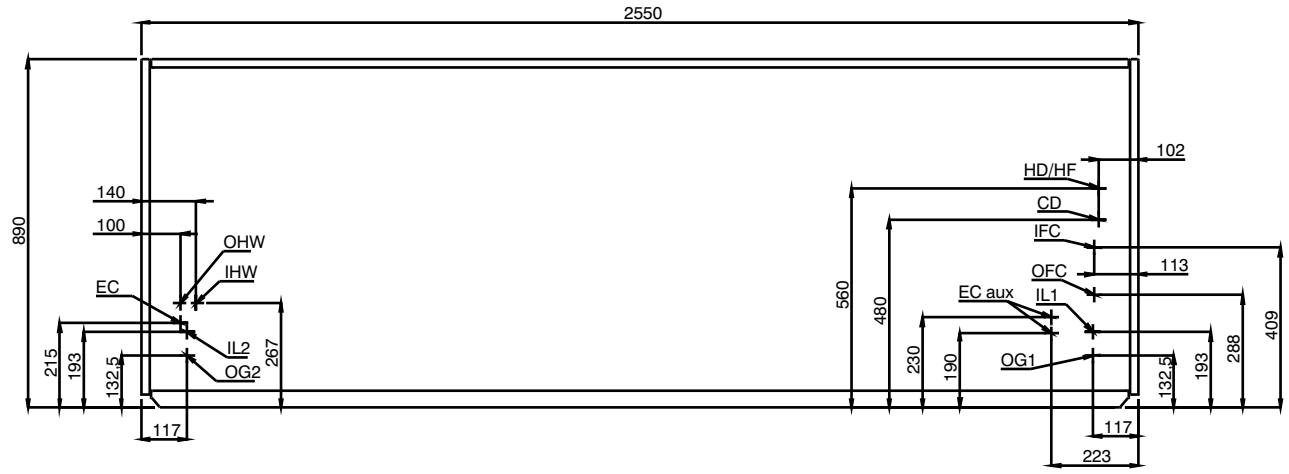


Fig. 12.j Refrigerant, water and electrical connections PX068-082-094-104-120 W-F-H, top view

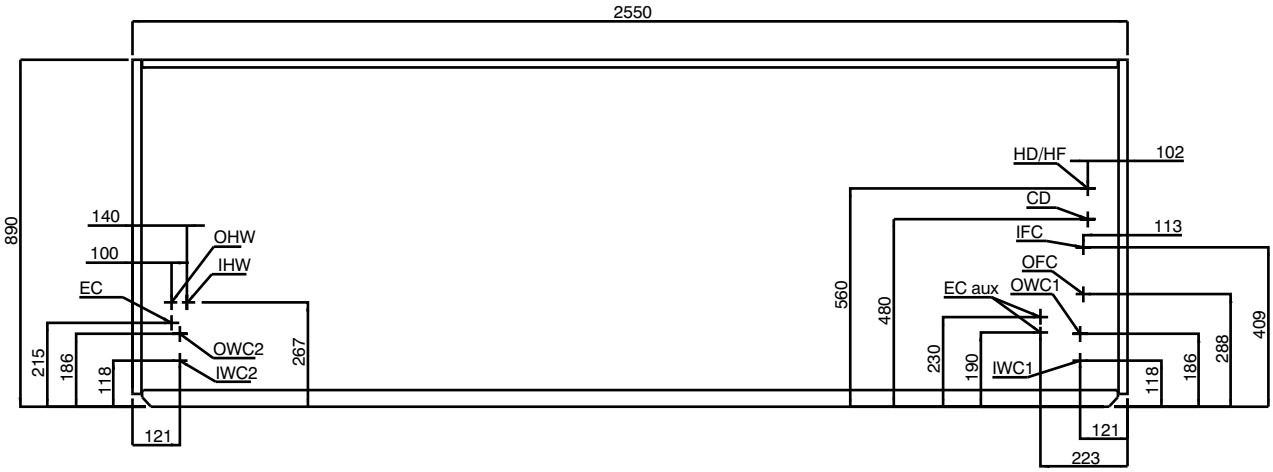


Fig. 12.k Refrigerant and water connections PX041-120 Downflow, side view

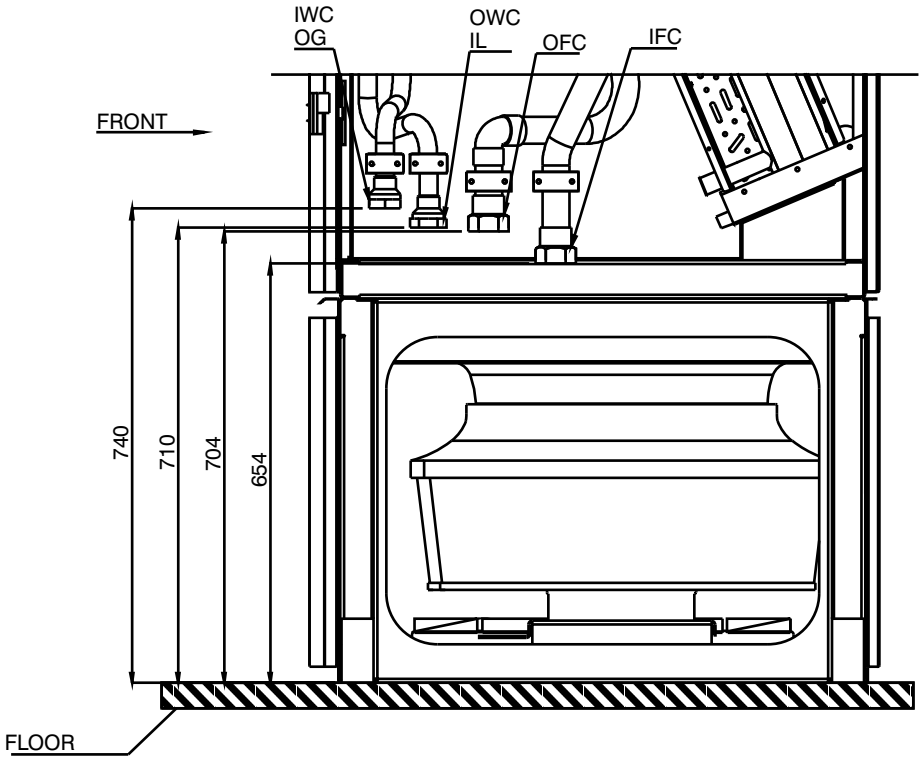
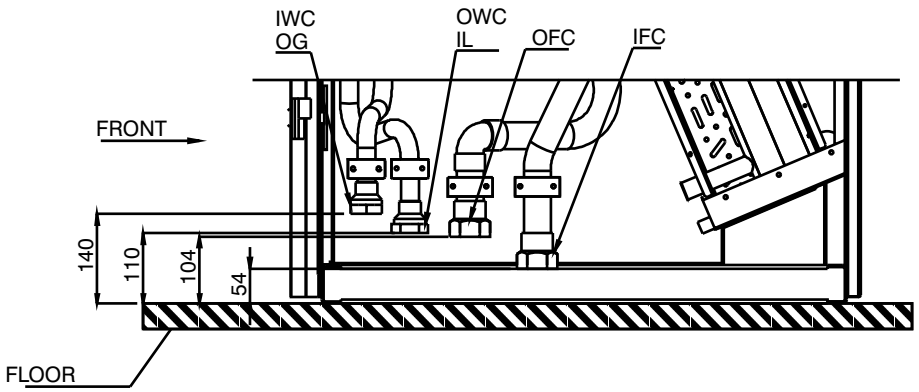


Fig. 12.l Refrigerant and water connections PX041-120 Upflow, side view

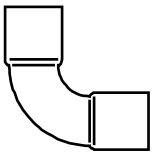
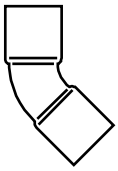
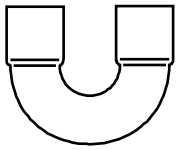


Dimensional Data / Connections

Tab. 12f — Pipe diameters (room unit — remote condenser)

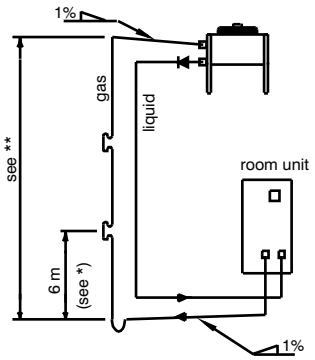
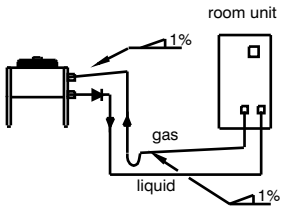
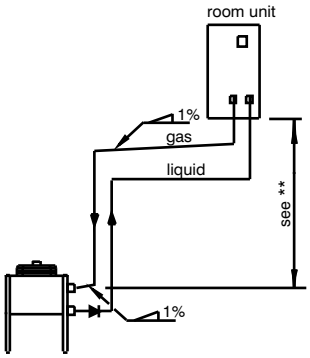
STANDARD PIPE DIAMETERS (Valid for equivalent lengths up to 100 m)		
MOD.	**copper tube external diametre x thickness [mm] R410A**	
	Gas	**Liquid**
PX041	22 x 1.5	18 x 1
PX045	28 x 1.5	22 x 1.5
PX059	28 x 1.5	22 x 1.5
PX047	28 x 1.5	22 x 1.5
PX051	28 x 1.5	22 x 1.5
PX057	28 x 1.5	22 x 1.5
PX044	18 x 1	16 x 1
PX054	22 x 1.5	16 x 1
PX062	22 x 1.5	18 x 1
PX074	22 x 1.5	18 x 1
PX092	28 x 1.5	22 x 1.5
PX068	22 x 1.5	18 x 1
PX082	22 x 1.5	18 x 1
PX094	28 x 1.5	22 x 1.5
PX104	28 x 1.5	22 x 1.5
PX120	28 x 1.5	22 x 1.5

Tab. 12g — Equivalent lengths (m) of: curves, shut—off and non—return valves

Nominal diameter (mm)	 **90°**	 **45°**	 **180°**	 **90°**	
12	0.50	0.25	0.75	2.10	1.90
14	0.53	0.26	0.80	2.20	2.00
16	0.55	0.27	0.85	2.40	2.10
18	0.60	0.30	0.95	2.70	2.40
22	0.70	0.35	1.10	3.20	2.80
28	0.80	0.45	1.30	4.00	3.30

Dimensional Data / Connections

Tab. 12h — Condenser positioning

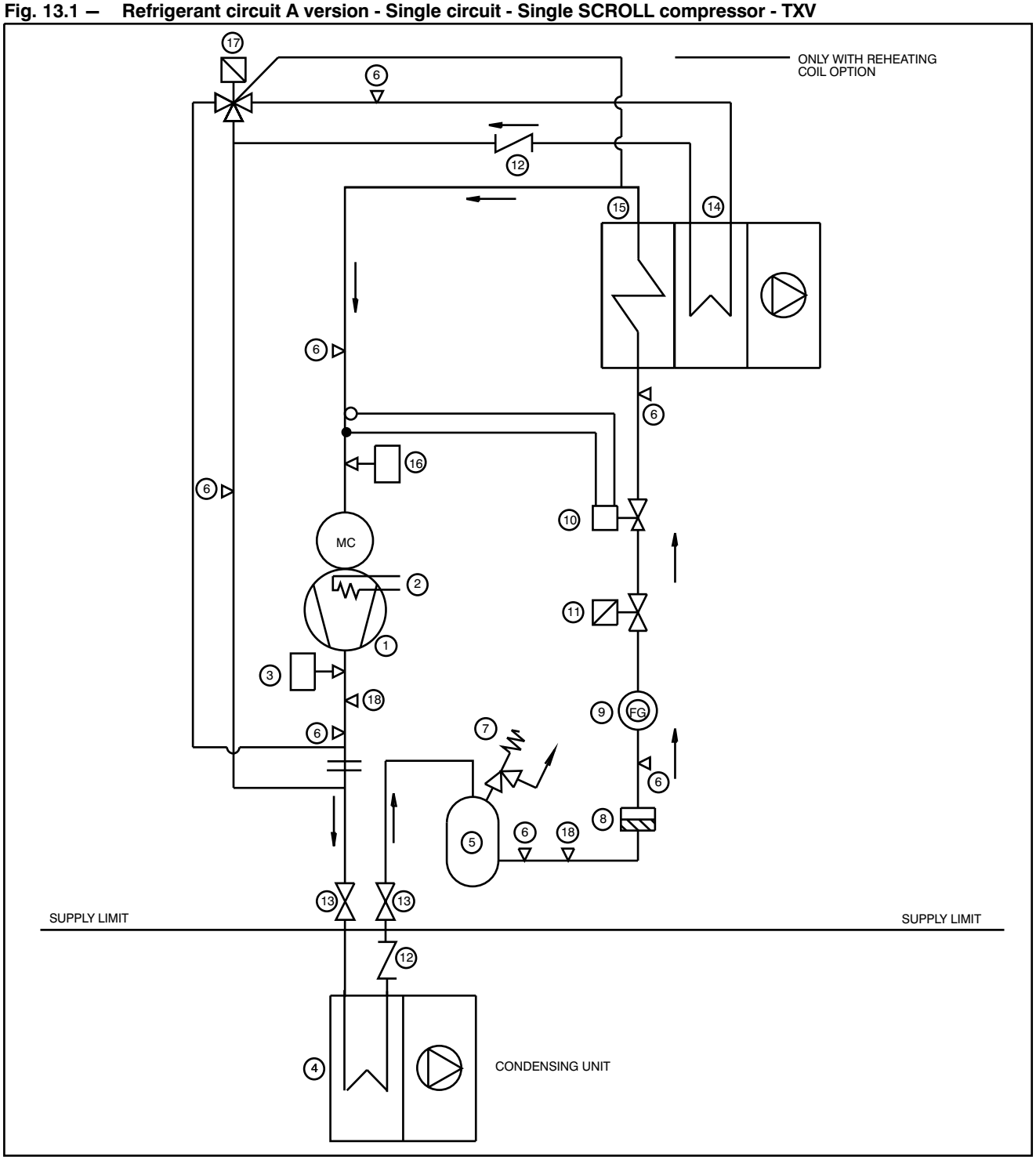
CONDENSER POSITION			CONDENSER ABOVE CONDITIONER	CONDENSER AND CONDITIONER AT SAME LEVEL	CONDENSER BELOW CONDITIONER (not recommended)
INSULATION	gas	int.	necessary	necessary	necessary
		ext.	only for aesthetic reasons	only for aesthetic reasons	only for aesthetic reasons
	liq.	int.	absolutely not	not necessary	no (expose to cold underfloor air)
		ext.	only for aesthetic reasons	only if exposed to sun	only if exposed to sun
LAYOUT			 (*) Oil traps every 6 m of vertical piping		

(**) see Chap. 3

Note: Create an oil trap on the horizontal discharge line before each lift.
Check the manufacturer's indication for the non-return valve orientation and position.

13 Refrigerant and Hydraulic Circuits

Fig. 13.1 — Refrigerant circuit A version - Single circuit - Single SCROLL compressor - TXV

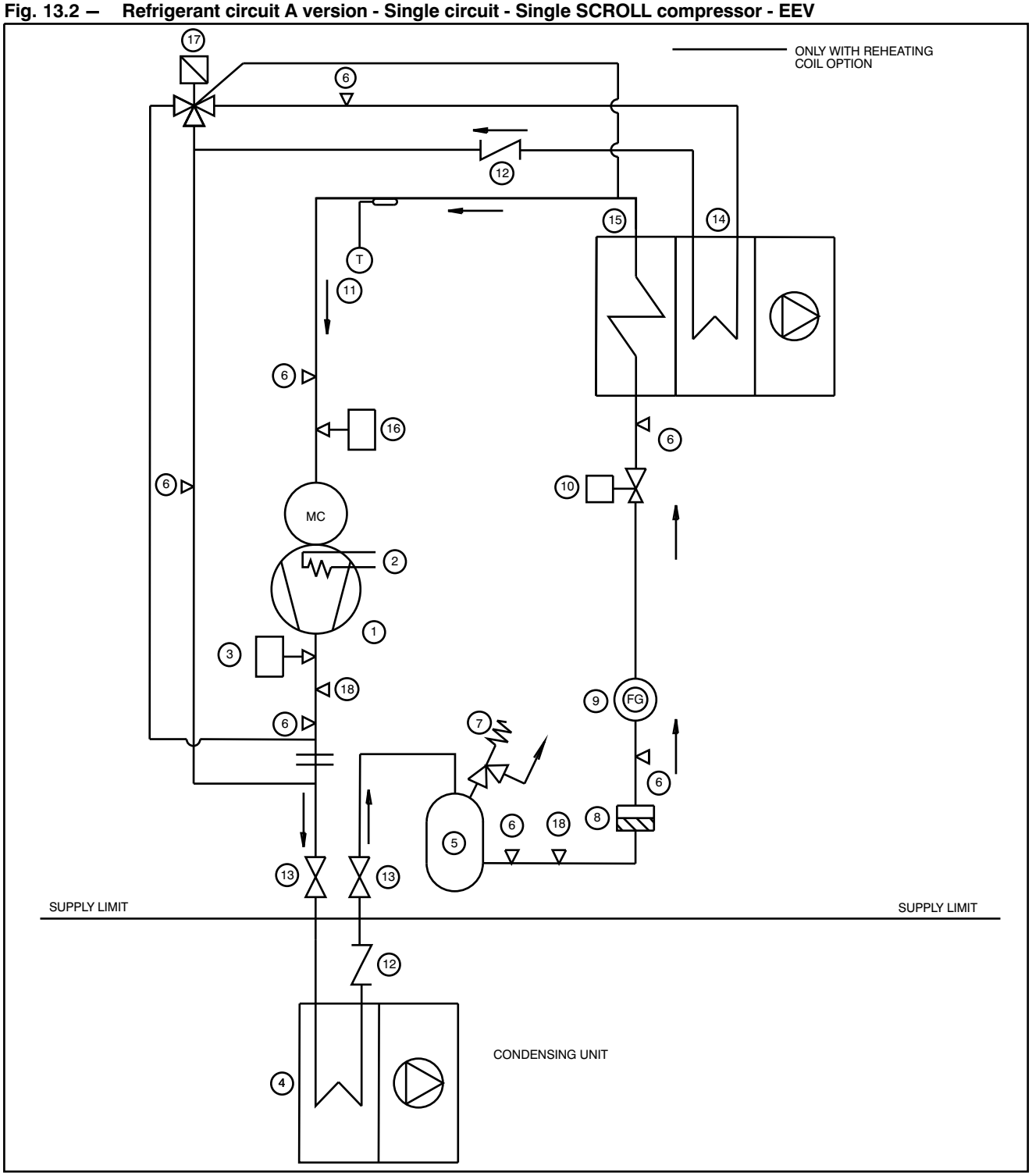


POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Air cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass

POS.	DESCRIPTION
10	Thermostatic expansion valve
11	Shut-off solenoid valve
12	Check valve
13	Shut-off valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Access valve 1/4

Refrigerant and Hydraulic Circuits

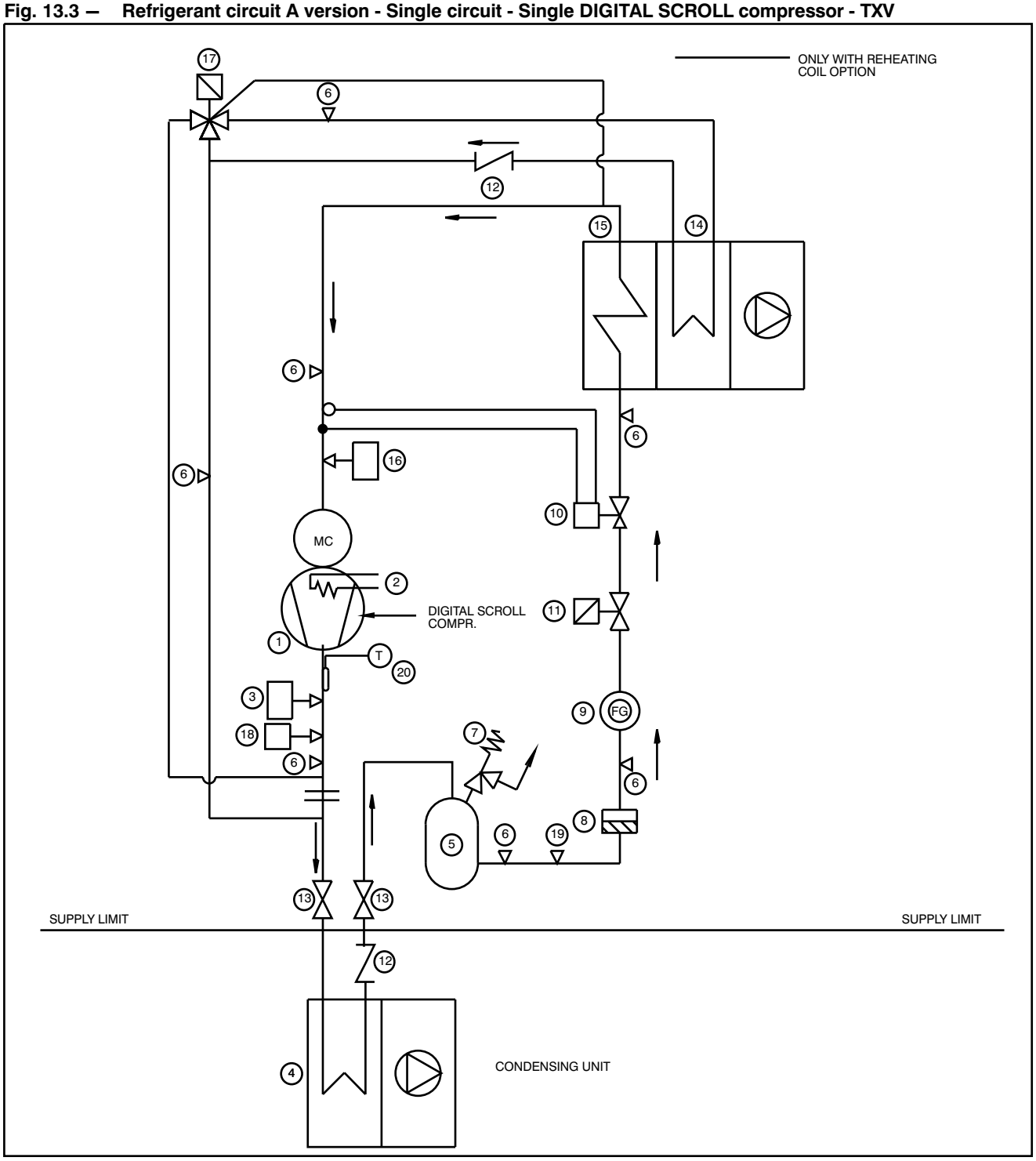
Fig. 13.2 — Refrigerant circuit A version - Single circuit - Single SCROLL compressor - EEV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Air cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass

POS.	DESCRIPTION
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV
12	Check valve
13	Shut-off valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer EEV
17	Reheating solenoid valve (optional)
18	Access valve 1/4

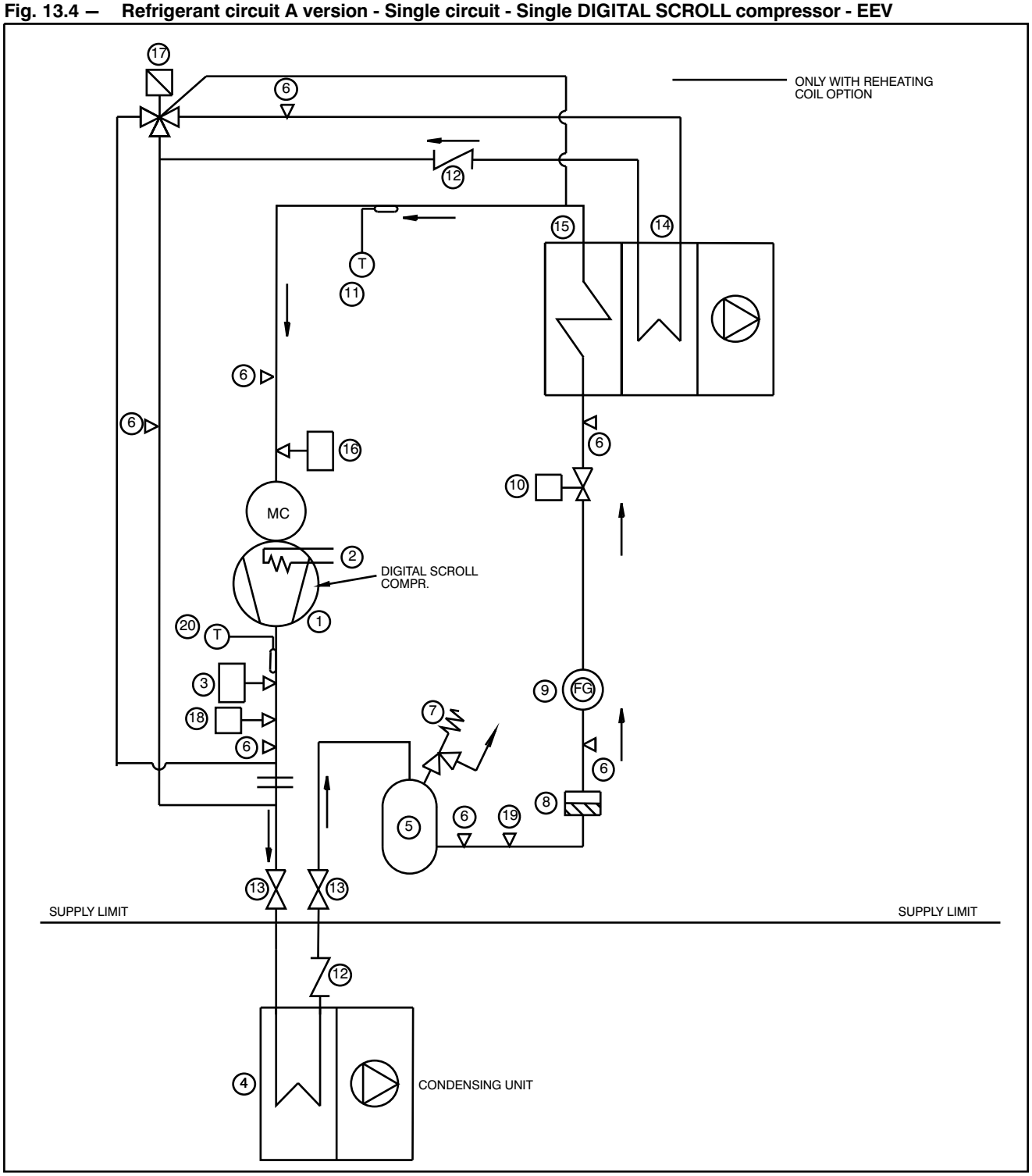
Fig. 13.3 — Refrigerant circuit A version - Single circuit - Single DIGITAL SCROLL compressor - TXV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Air cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Thermostatic expansion valve

POS.	DESCRIPTION
11	Shut-off solenoid valve
12	Check valve
13	Shut-off valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	High pressure transducer
19	Access valve 1/4
20	NTC Temperature sensor for DIGITAL SCROLL compressor

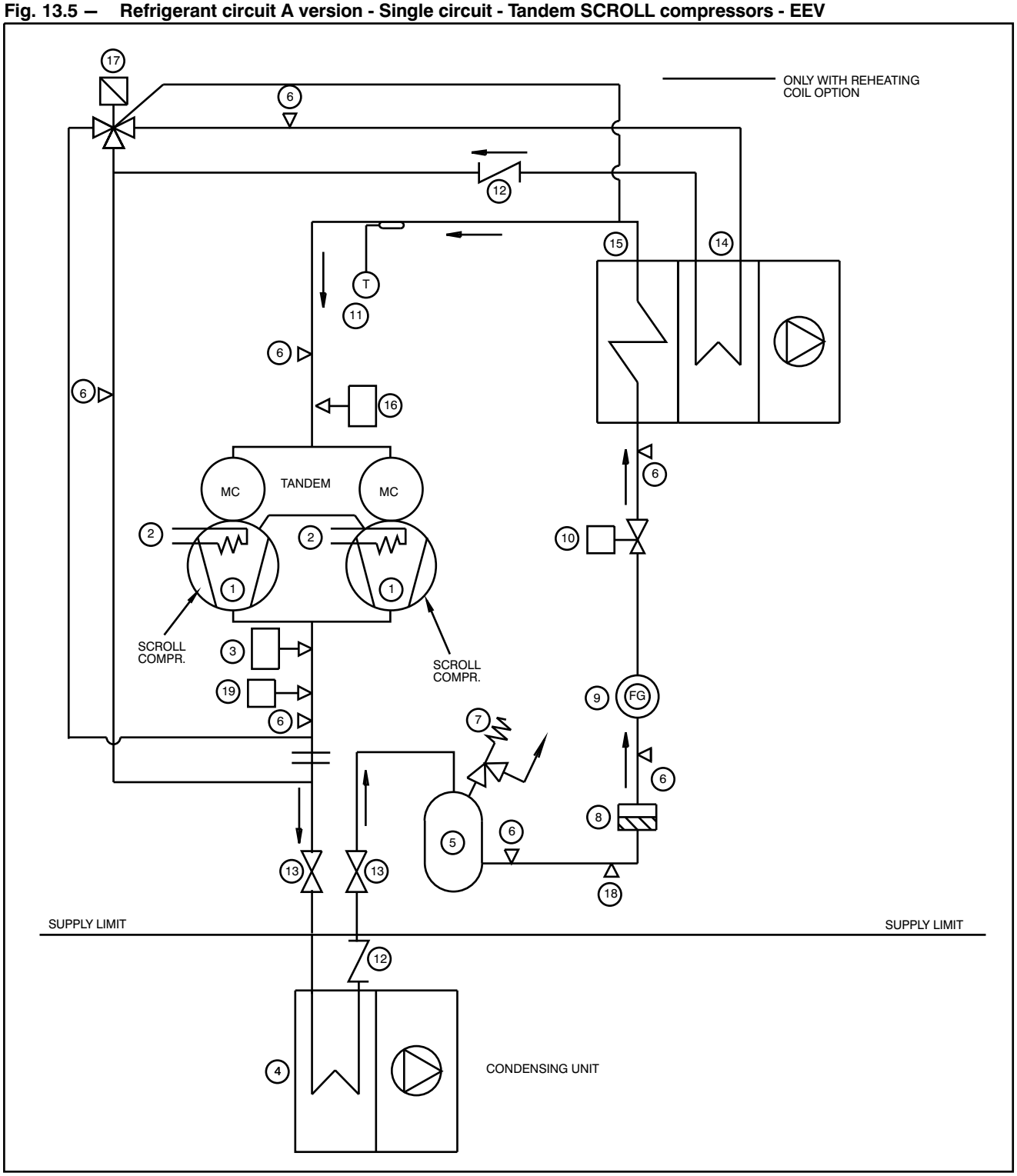
Fig. 13.4 — Refrigerant circuit A version - Single circuit - Single DIGITAL SCROLL compressor - EEV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Air cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)

POS.	DESCRIPTION
11	Temperature sensor for EEV
12	Check valve
13	Shut-off valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer EEV
17	Reheating solenoid valve (optional)
18	High pressure transducer
19	Access valve 1/4
20	NTC Temperature sensor for DIGITAL SCROLL compressor

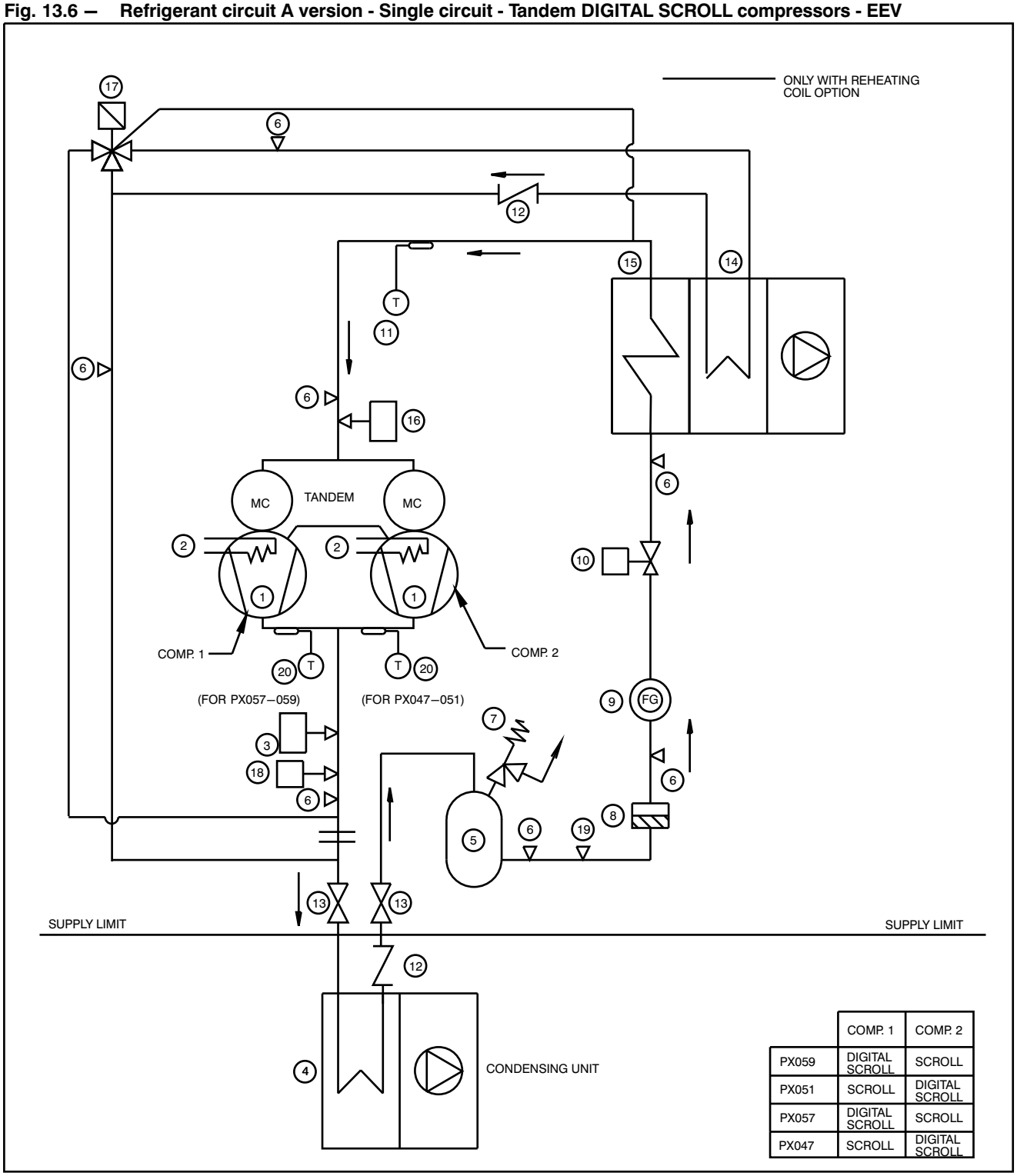
Fig. 13.5 — Refrigerant circuit A version - Single circuit - Tandem SCROLL compressors - EEV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Air cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)

POS.	DESCRIPTION
11	Temperature sensor for EEV
12	Check valve
13	Shut-off valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer EEV
17	Reheating solenoid valve (optional)
18	Access valve 1/4
19	High pressure transducer

Fig. 13.6 — Refrigerant circuit A version - Single circuit - Tandem DIGITAL SCROLL compressors - EEV

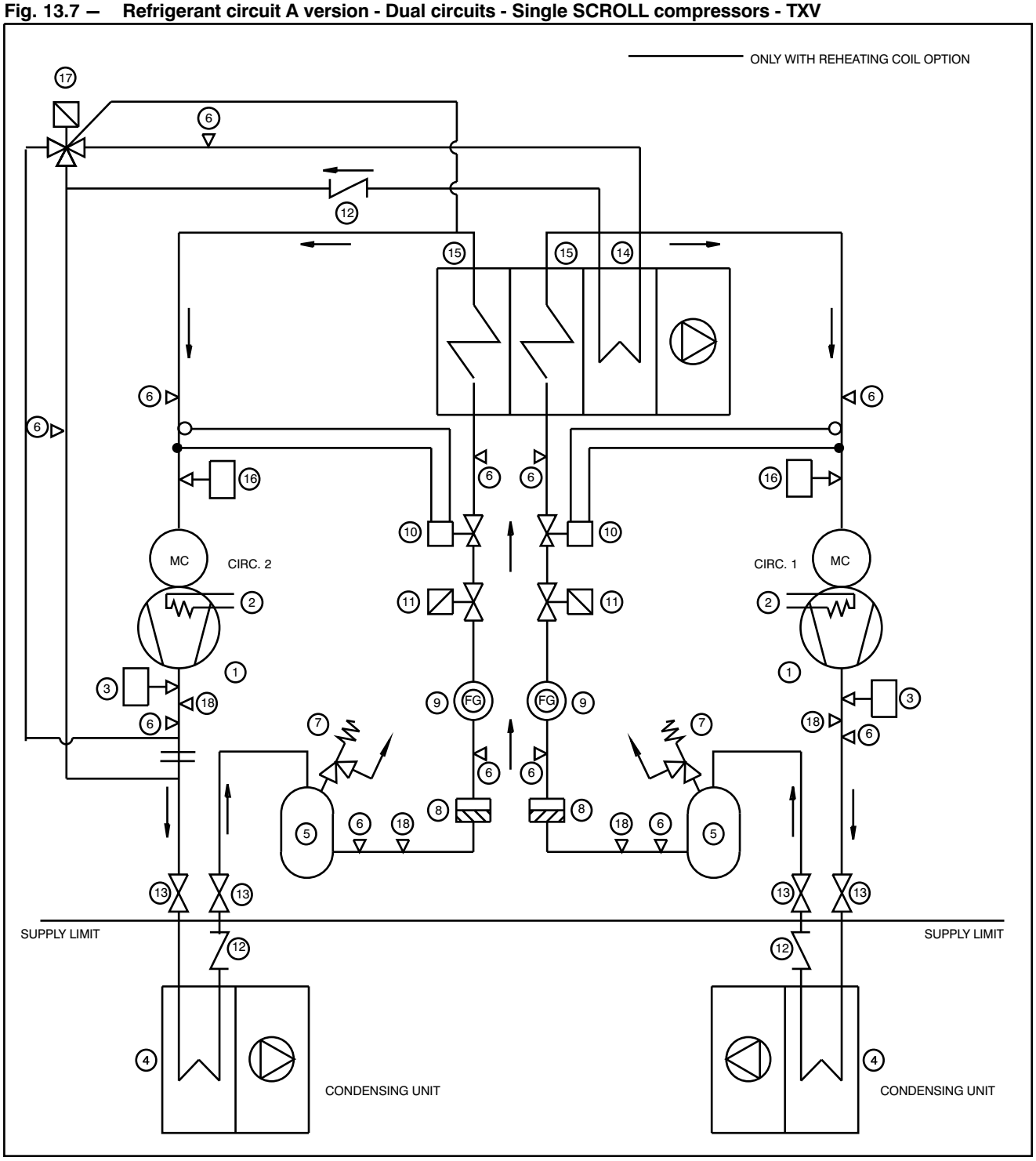


	COMP. 1	COMP. 2
PX059	DIGITAL SCROLL	SCROLL
PX051	SCROLL	DIGITAL SCROLL
PX057	DIGITAL SCROLL	SCROLL
PX047	SCROLL	DIGITAL SCROLL

POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Air cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)

POS.	DESCRIPTION
11	Temperature sensor for EEV
12	Check valve
13	Shut-off valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer EEV
17	Reheating solenoid valve (optional)
18	High pressure transducer
19	Access valve 1/4
20	NTC Temperature sensor for DIGITAL SCROLL compressor

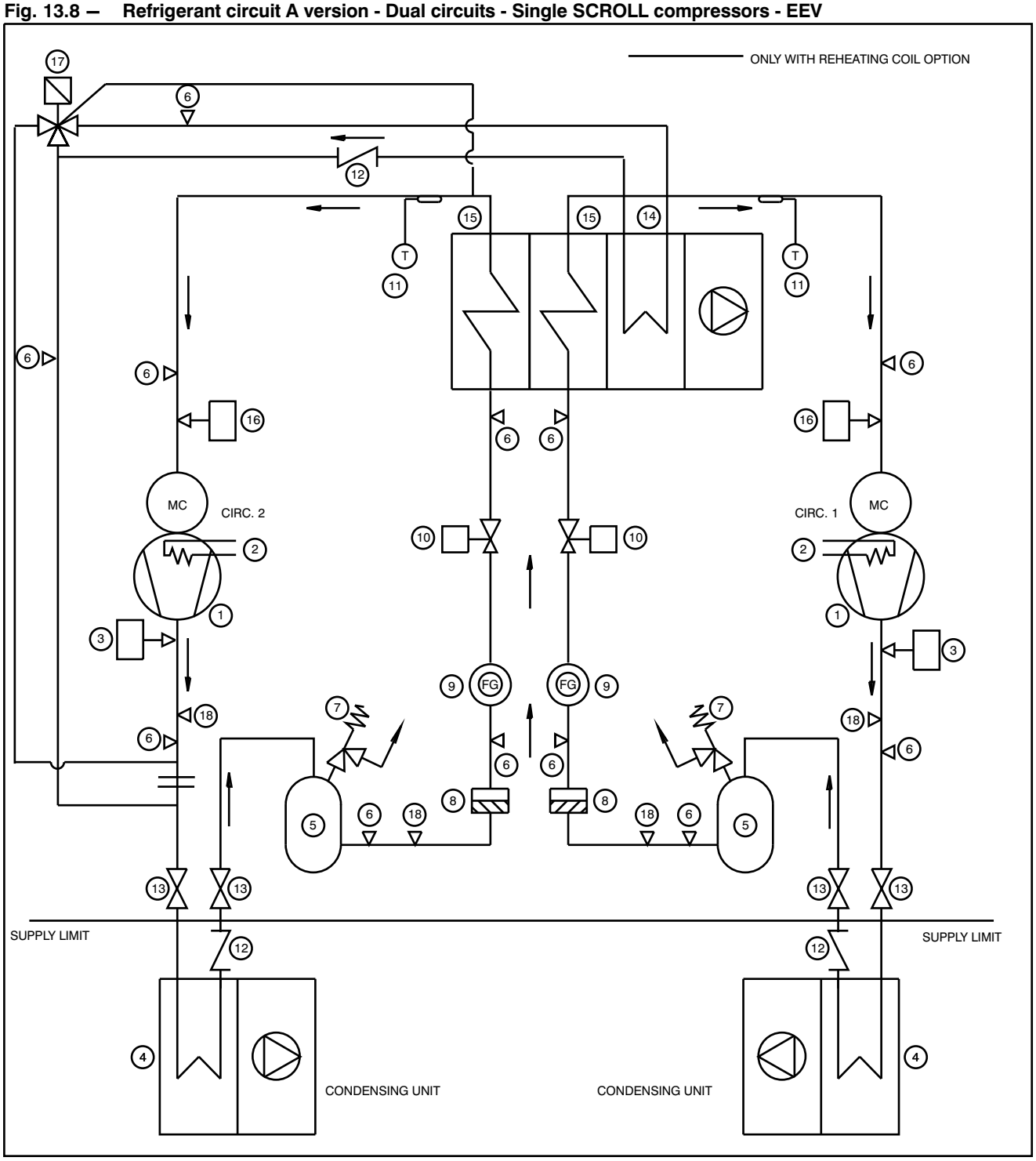
Fig. 13.7 — Refrigerant circuit A version - Dual circuits - Single SCROLL compressors - TXV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Air cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass

POS.	DESCRIPTION
10	Thermostatic expansion valve
11	Shut-off solenoid valve
12	Check valve
13	Shut-off valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Access valve 1/4

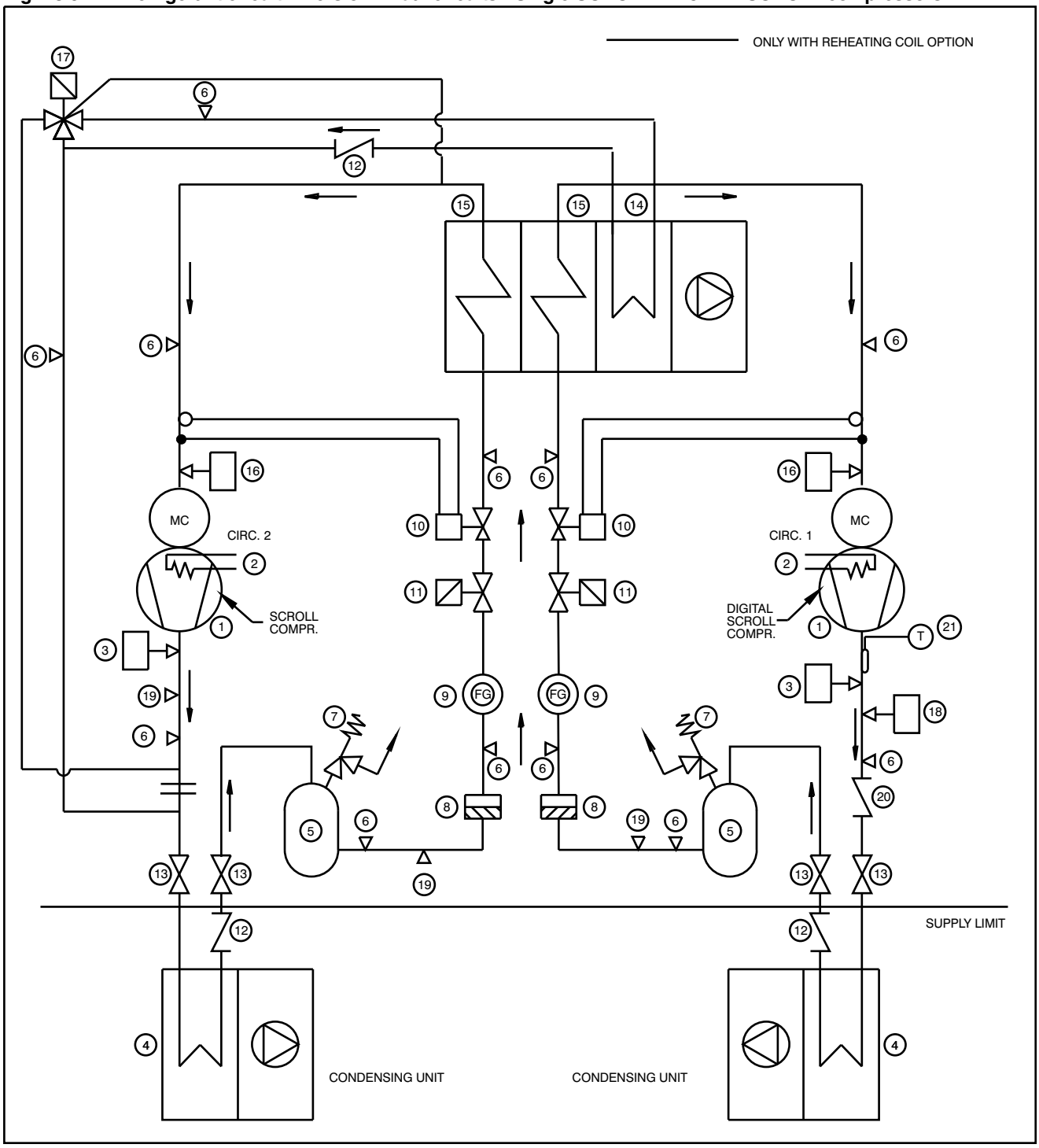
Fig. 13.8 — Refrigerant circuit A version - Dual circuits - Single SCROLL compressors - EEV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Air cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass

POS.	DESCRIPTION
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV
12	Check valve
13	Shut-off valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer EEV
17	Reheating solenoid valve (optional)
18	Access valve 1/4

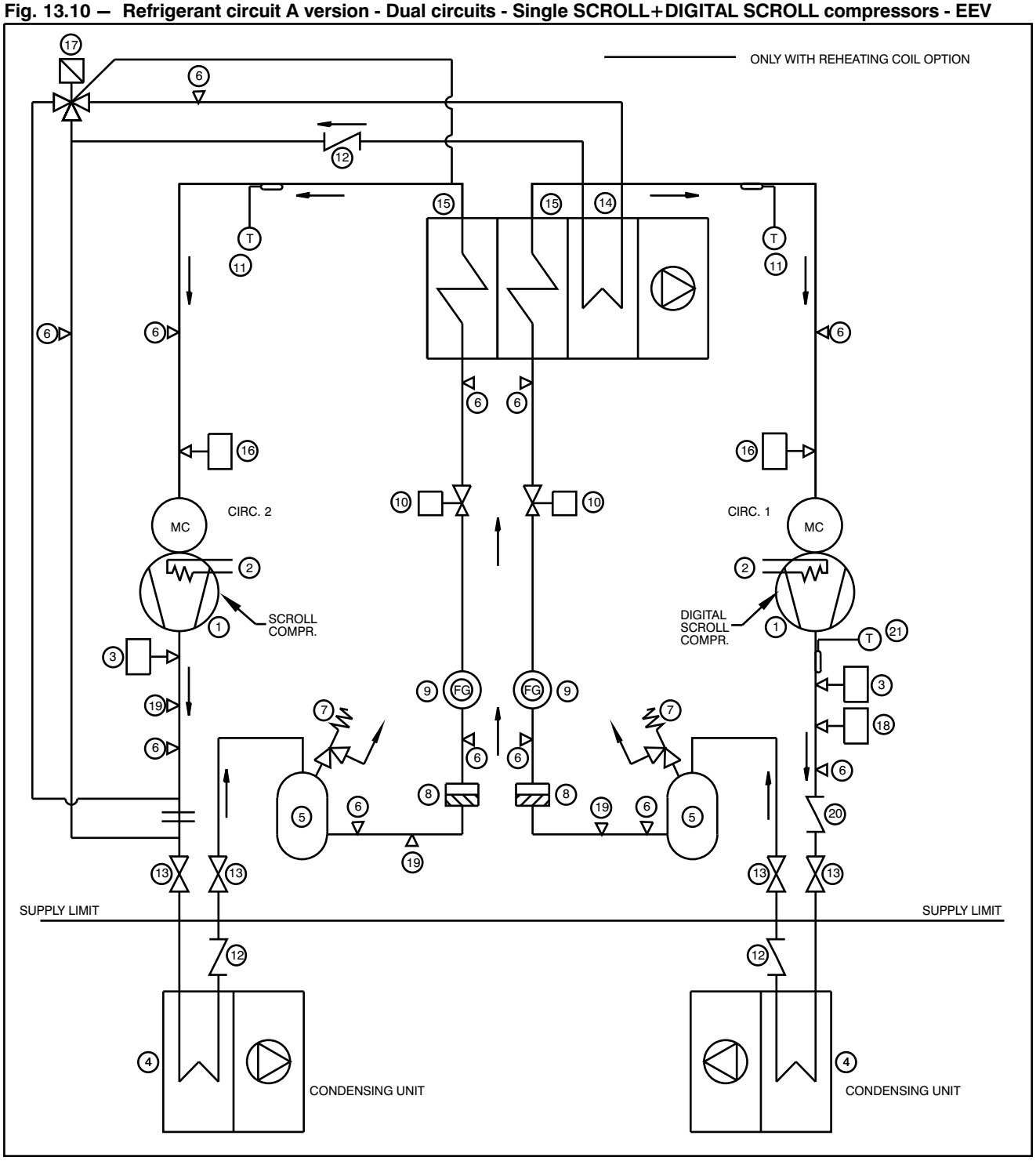
Fig. 13.9 – Refrigerant circuit A version - Dual circuits - Single SCROLL+DIGITAL SCROLL compressors - TXV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Air cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Thermostatic expansion valve
11	Shut-off solenoid valve

POS.	DESCRIPTION
12	Check valve
13	Shut-off valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	High pressure transducer
19	Access valve 1/4
20	Check valve (only for PX044-054)
21	NTC Temperature sensor for DIGITAL SCROLL compressor

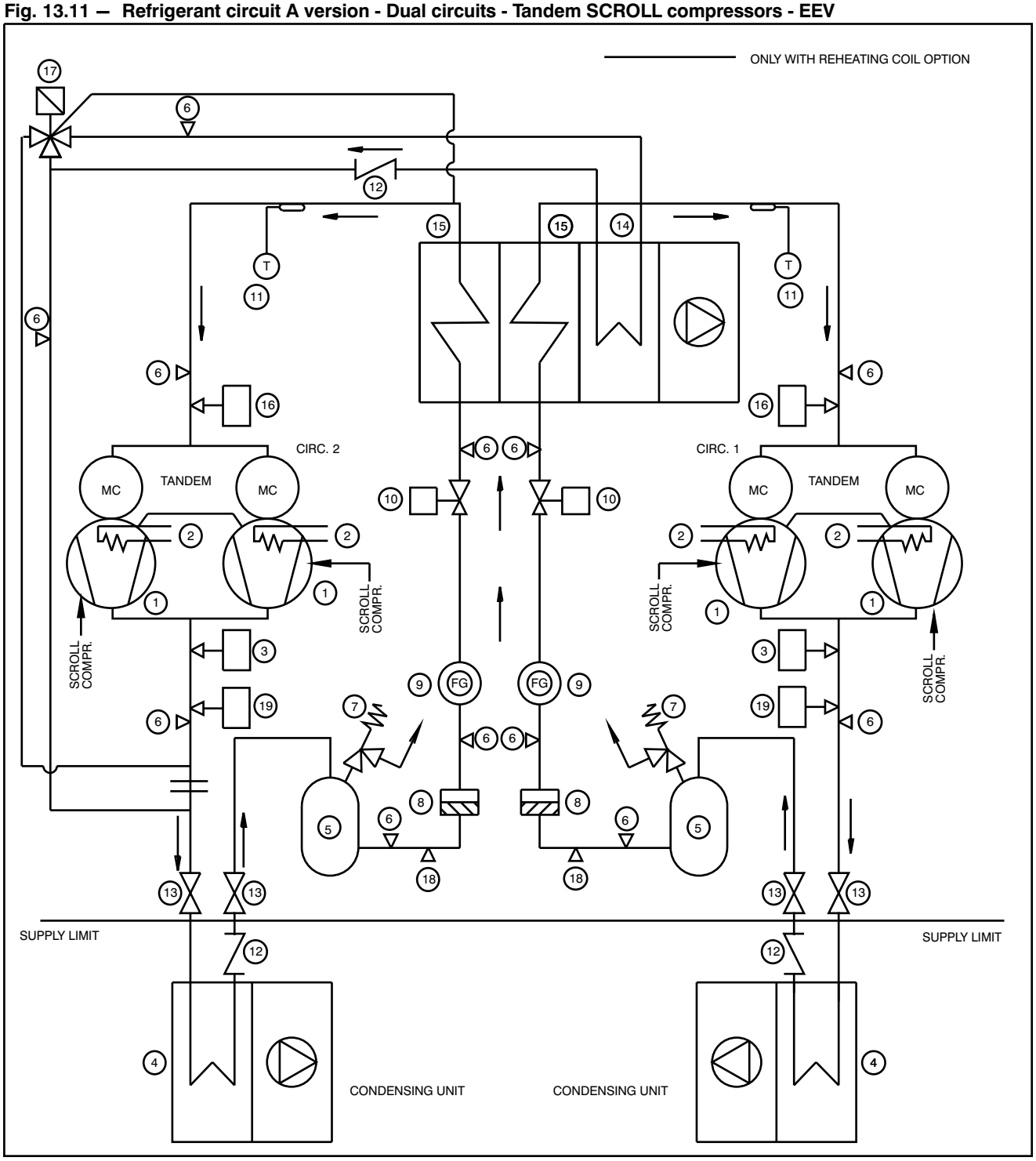
Fig. 13.10 — Refrigerant circuit A version - Dual circuits - Single SCROLL+DIGITAL SCROLL compressors - EEV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Air cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV

POS.	DESCRIPTION
12	Check valve
13	Shut-off valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	High pressure transducer
19	Access valve 1/4
20	Check valve (only for PX044-054)
21	NTC Temperature sensor for DIGITAL SCROLL compressor

Fig. 13.11 — Refrigerant circuit A version - Dual circuits - Tandem SCROLL compressors - EEV

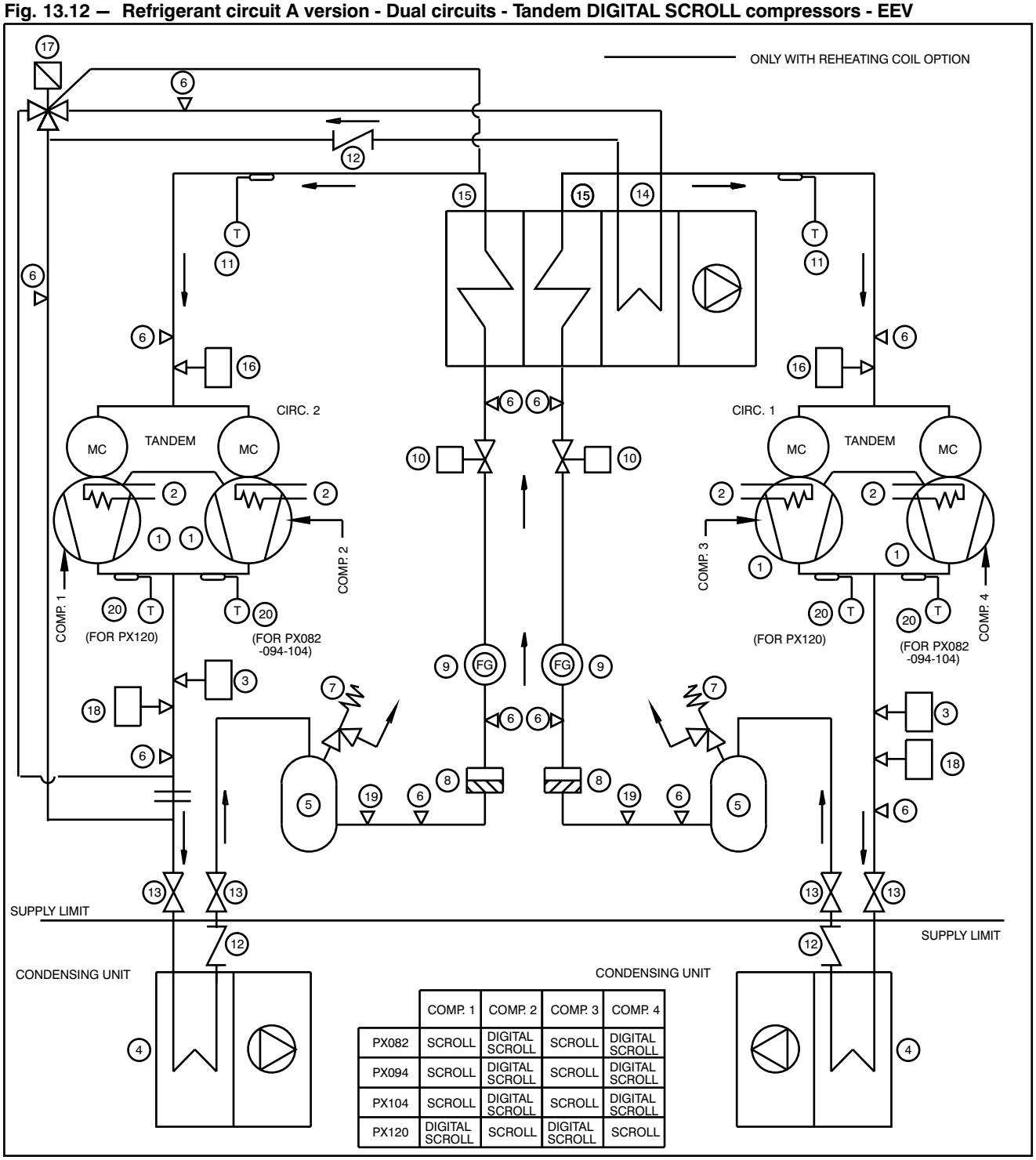


POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Air cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)

POS.	DESCRIPTION
11	Temperature sensor for EEV
12	Check valve
13	Shut-off valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Access valve 1/4
19	High pressure transducer

Refrigerant and Hydraulic Circuits

Fig. 13.12 — Refrigerant circuit A version - Dual circuits - Tandem DIGITAL SCROLL compressors - EEV

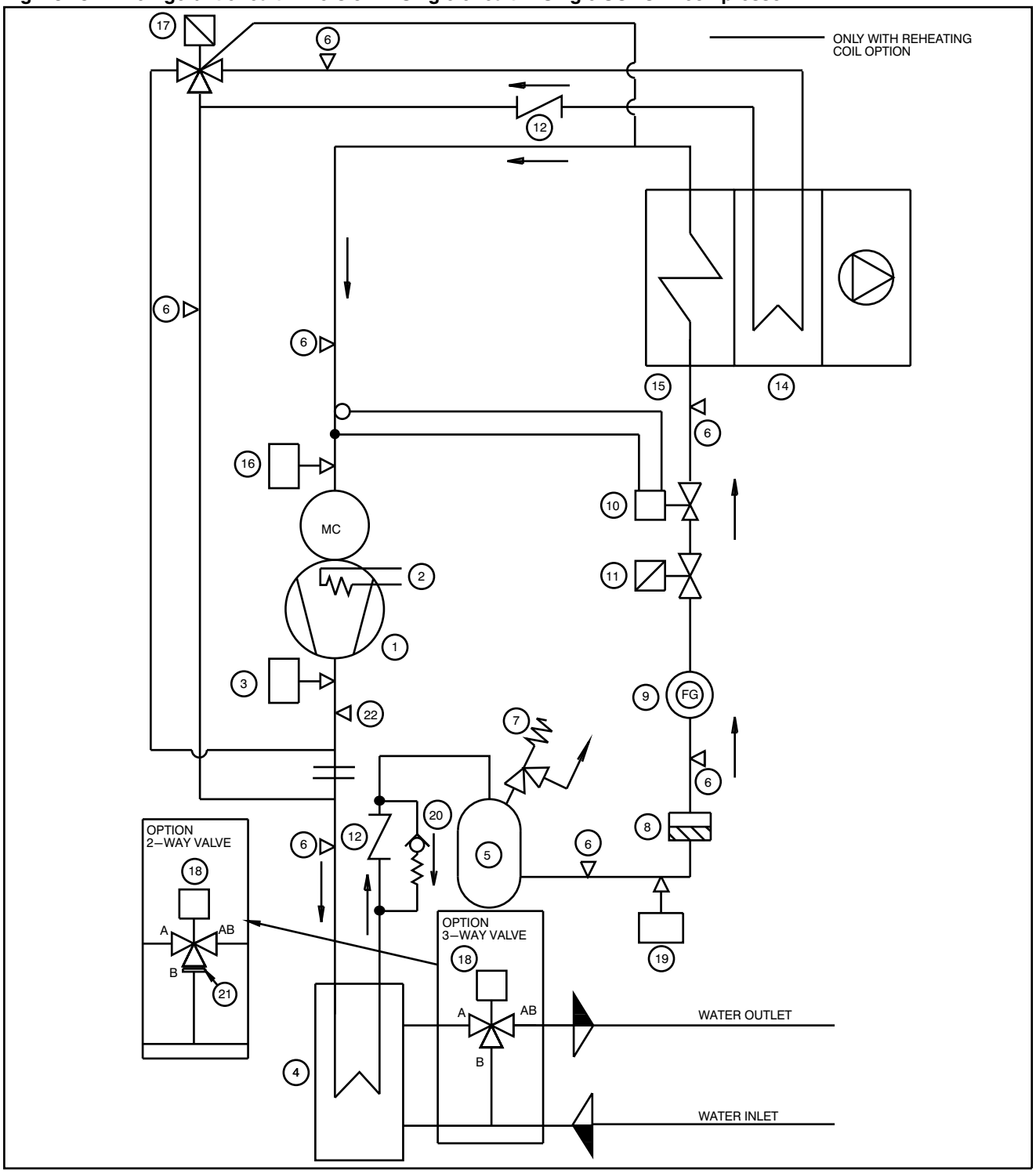


	COMP. 1	COMP. 2	COMP. 3	COMP. 4
PX082	SCROLL	DIGITAL SCROLL	SCROLL	DIGITAL SCROLL
PX094	SCROLL	DIGITAL SCROLL	SCROLL	DIGITAL SCROLL
PX104	SCROLL	DIGITAL SCROLL	SCROLL	DIGITAL SCROLL
PX120	DIGITAL SCROLL	SCROLL	DIGITAL SCROLL	SCROLL

POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Air cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)

POS.	DESCRIPTION
11	Temperature sensor for EEV
12	Check valve
13	Shut-off valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	High pressure transducer
19	Access valve 1/4
20	NTC Temperature sensor for DIGITAL SCROLL compressor

Fig. 13.13 — Refrigerant circuit W version — Single circuit — Single SCROLL compressor — TXV

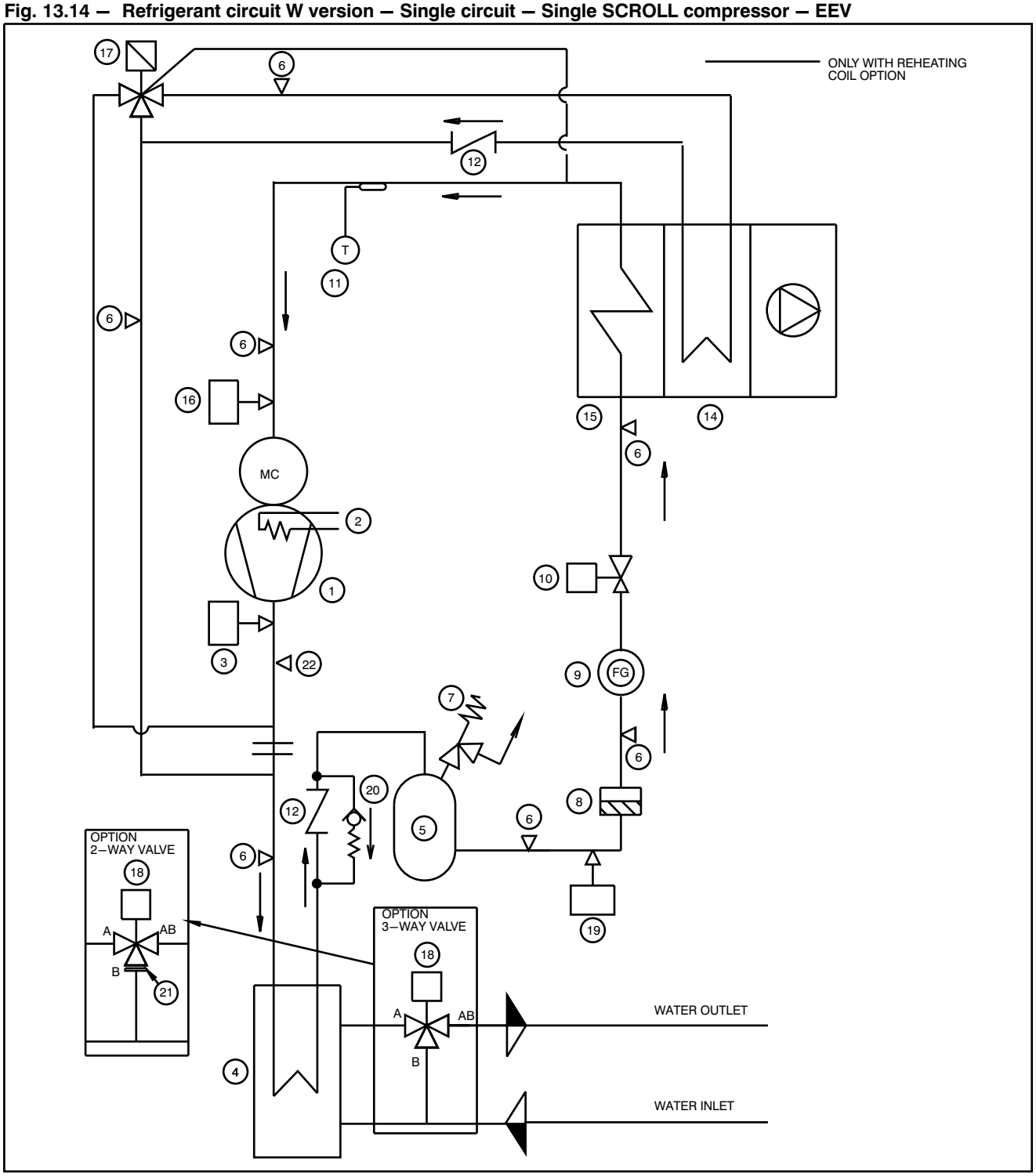


POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Thermostatic expansion valve
11	Shut–off solenoid valve

POS.	DESCRIPTION
12	Check valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Check valve 10 bar (145 psi)
21	Blind disk — only with optional 2–way valve
22	Access valve 1/4

Refrigerant and Hydraulic Circuits

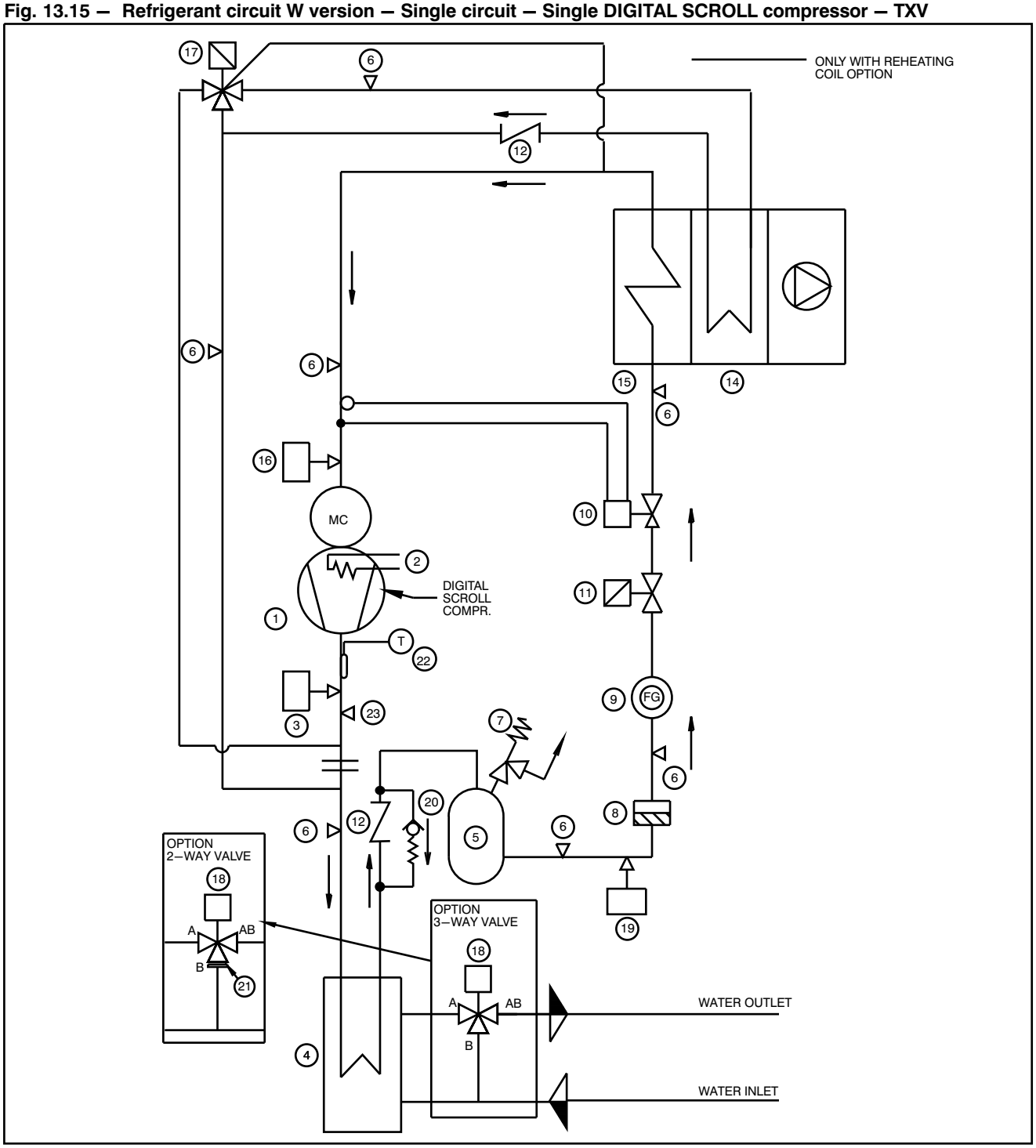
Fig. 13.14 — Refrigerant circuit W version — Single circuit — Single SCROLL compressor — EEV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV

POS.	DESCRIPTION
12	Check valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Check valve 10 bar (145 psi)
21	Blind disk — only with optional 2—way valve
22	Access valve 1/4

Fig. 13.15 — Refrigerant circuit W version — Single circuit — Single DIGITAL SCROLL compressor — TXV

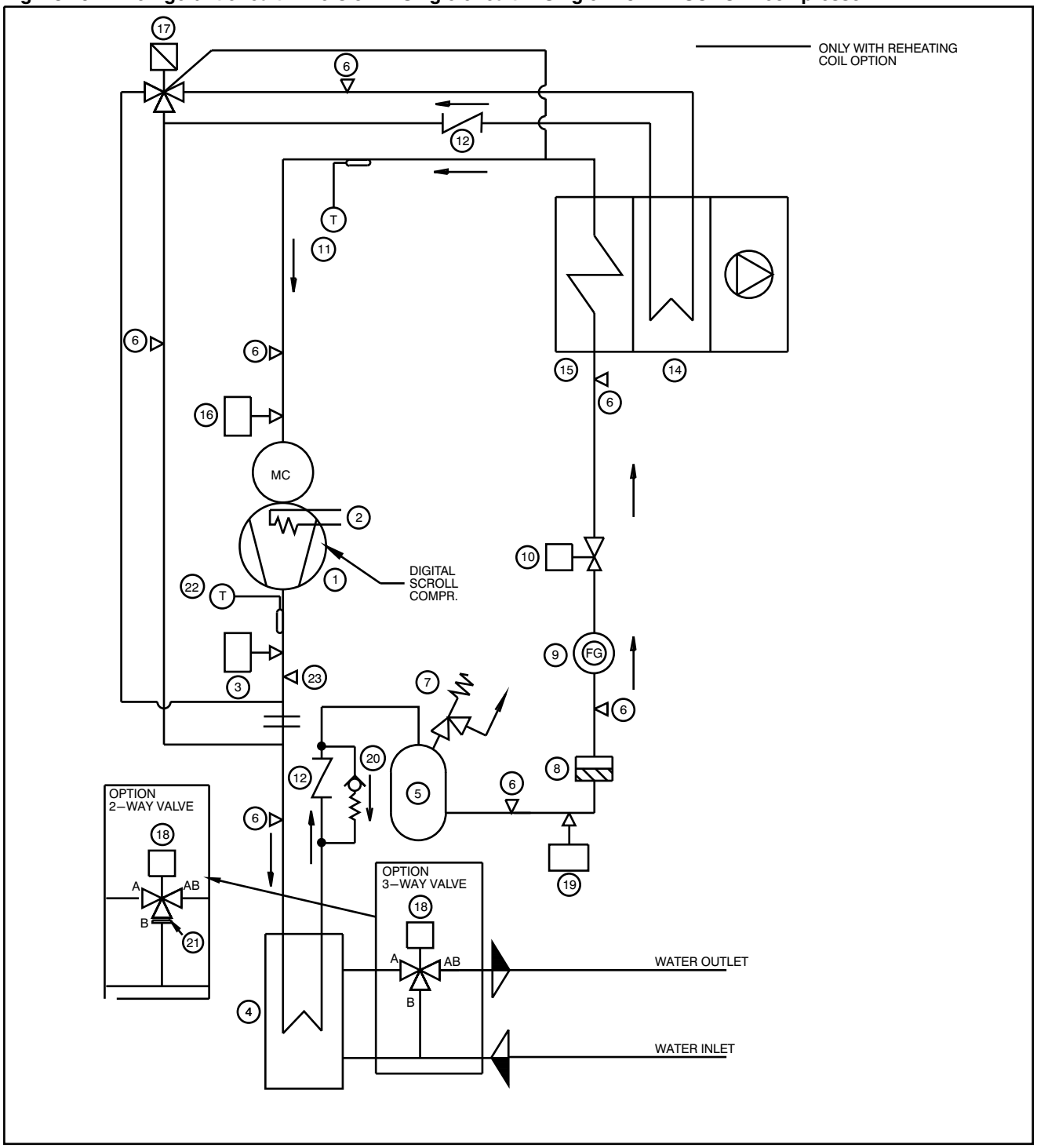


POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Thermostatic expansion valve
11	Shut–off solenoid valve

POS.	DESCRIPTION
12	Check valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Check valve 10 bar (145 psi)
21	Blind disk — only with optional 2–way valve
22	NTC Temperature sensor for DIGITAL SCROLL compressor
23	Access valve 1/4

Refrigerant and Hydraulic Circuits

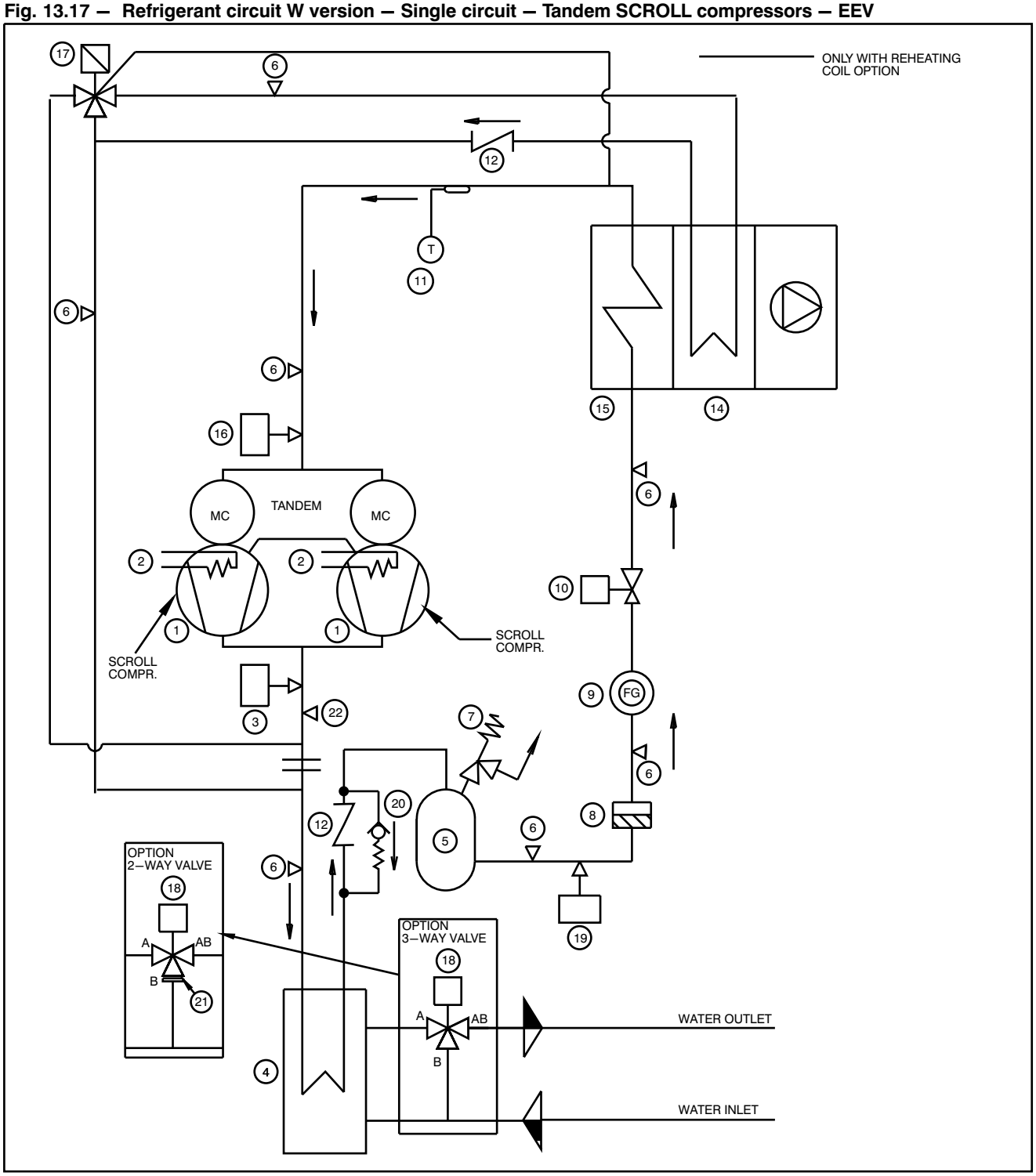
Fig. 13.16 — Refrigerant circuit W version — Single circuit — Single DIGITAL SCROLL compressor — EEV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV

POS.	DESCRIPTION
12	Check valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Check valve 10 bar (145 psi)
21	Blind disk — only with optional 2—way valve
22	NTC Temperature sensor for DIGITAL SCROLL compressor
23	Access valve 1/4

Fig. 13.17 – Refrigerant circuit W version – Single circuit – Tandem SCROLL compressors – EEV

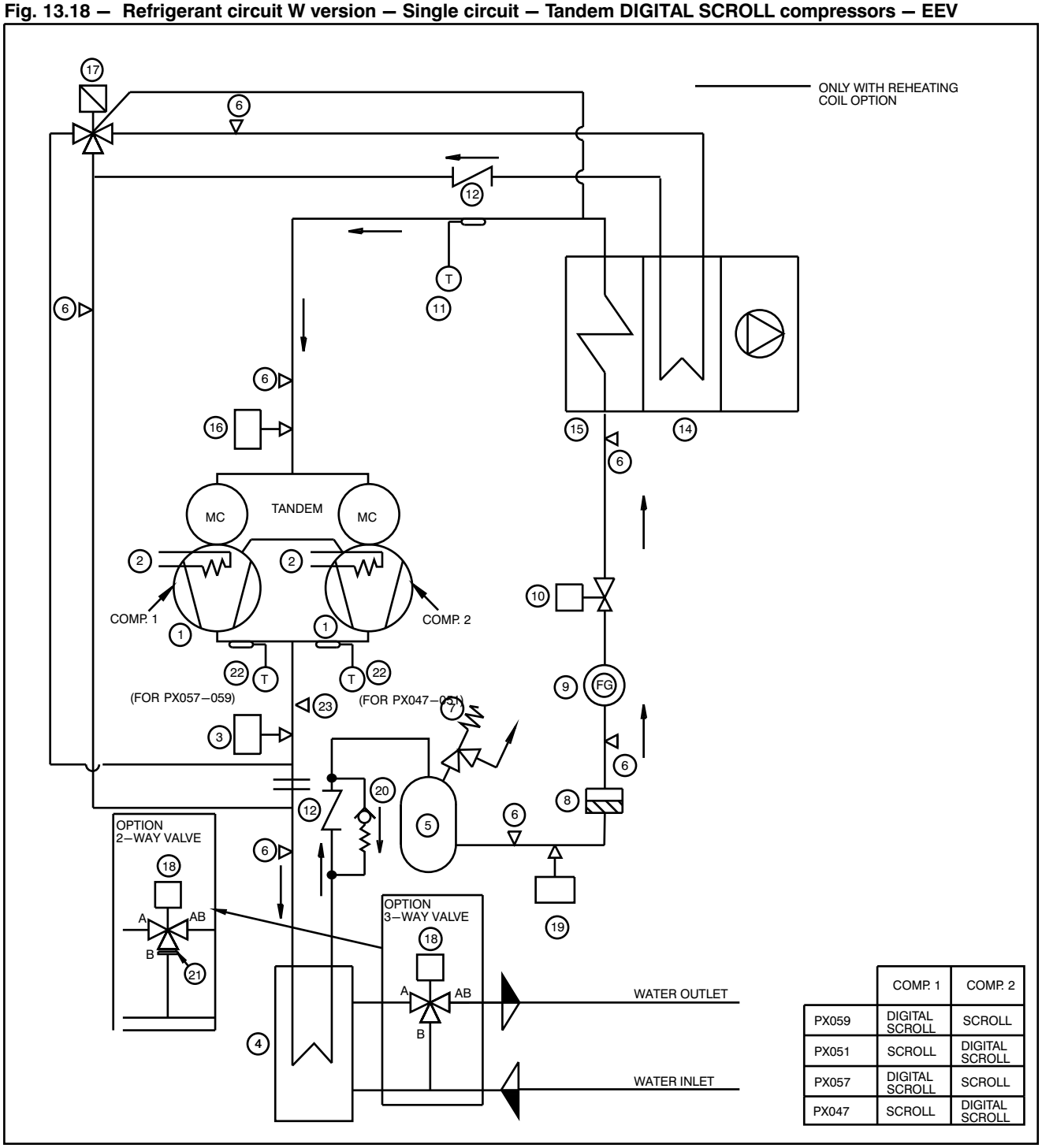


POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV

POS.	DESCRIPTION
12	Check valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Check valve 10 bar (145 psi)
21	Blind disk – only with optional 2–way valve
22	Access valve 1/4

Refrigerant and Hydraulic Circuits

Fig. 13.18 — Refrigerant circuit W version — Single circuit — Tandem DIGITAL SCROLL compressors — EEV

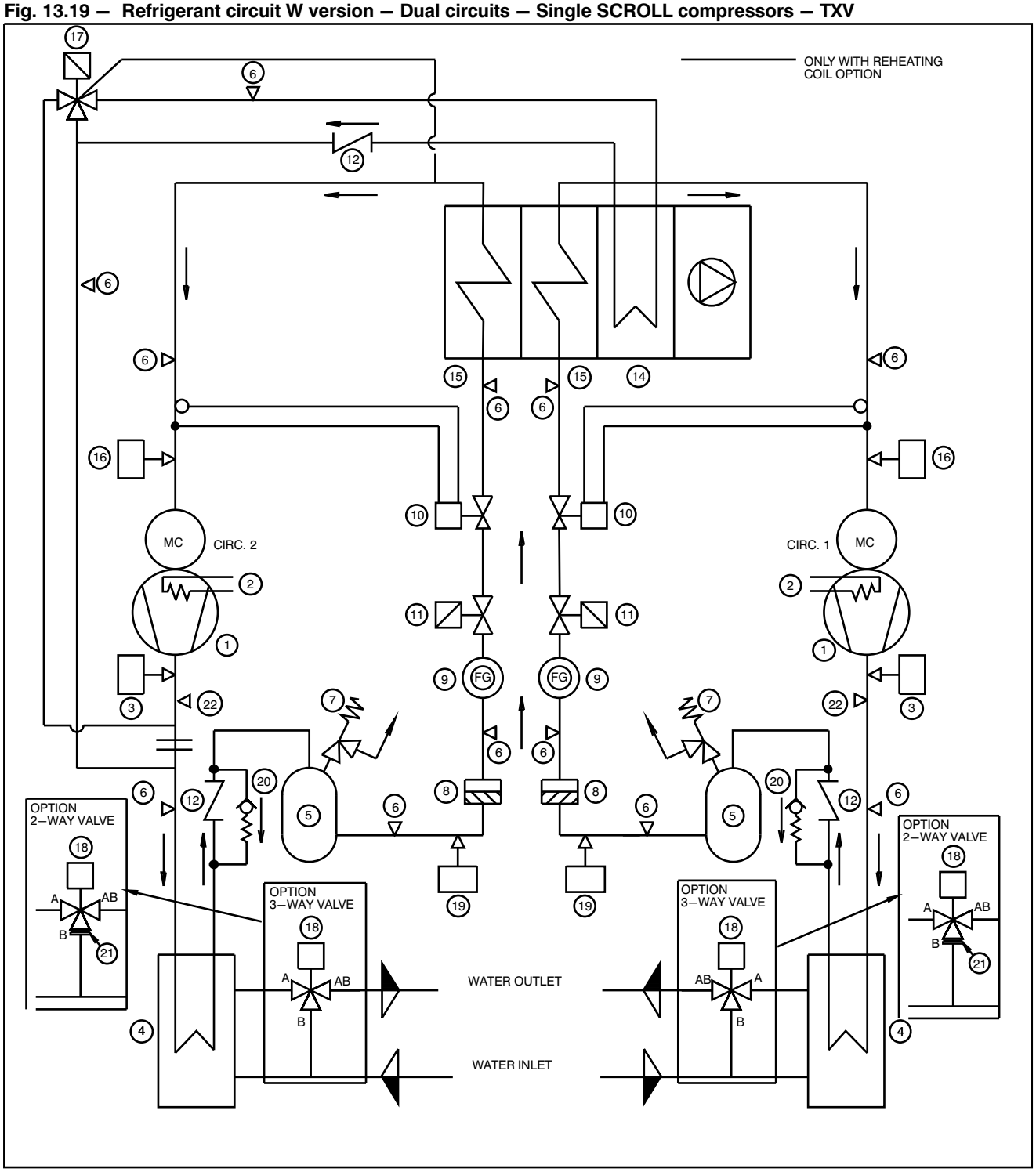


	COMP. 1	COMP. 2
PX059	DIGITAL SCROLL	SCROLL
PX051	SCROLL	DIGITAL SCROLL
PX057	DIGITAL SCROLL	SCROLL
PX047	SCROLL	DIGITAL SCROLL

POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV
12	Check valve

POS.	DESCRIPTION
13	Pressure transducer for electronic expansion valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Check valve 10 bar (145 psi)
21	Blind disk — only with optional 2–way valve
22	NTC Temperature sensor for DIGITAL SCROLL compressor
23	Access valve 1/4

Fig. 13.19 – Refrigerant circuit W version – Dual circuits – Single SCROLL compressors – TXV

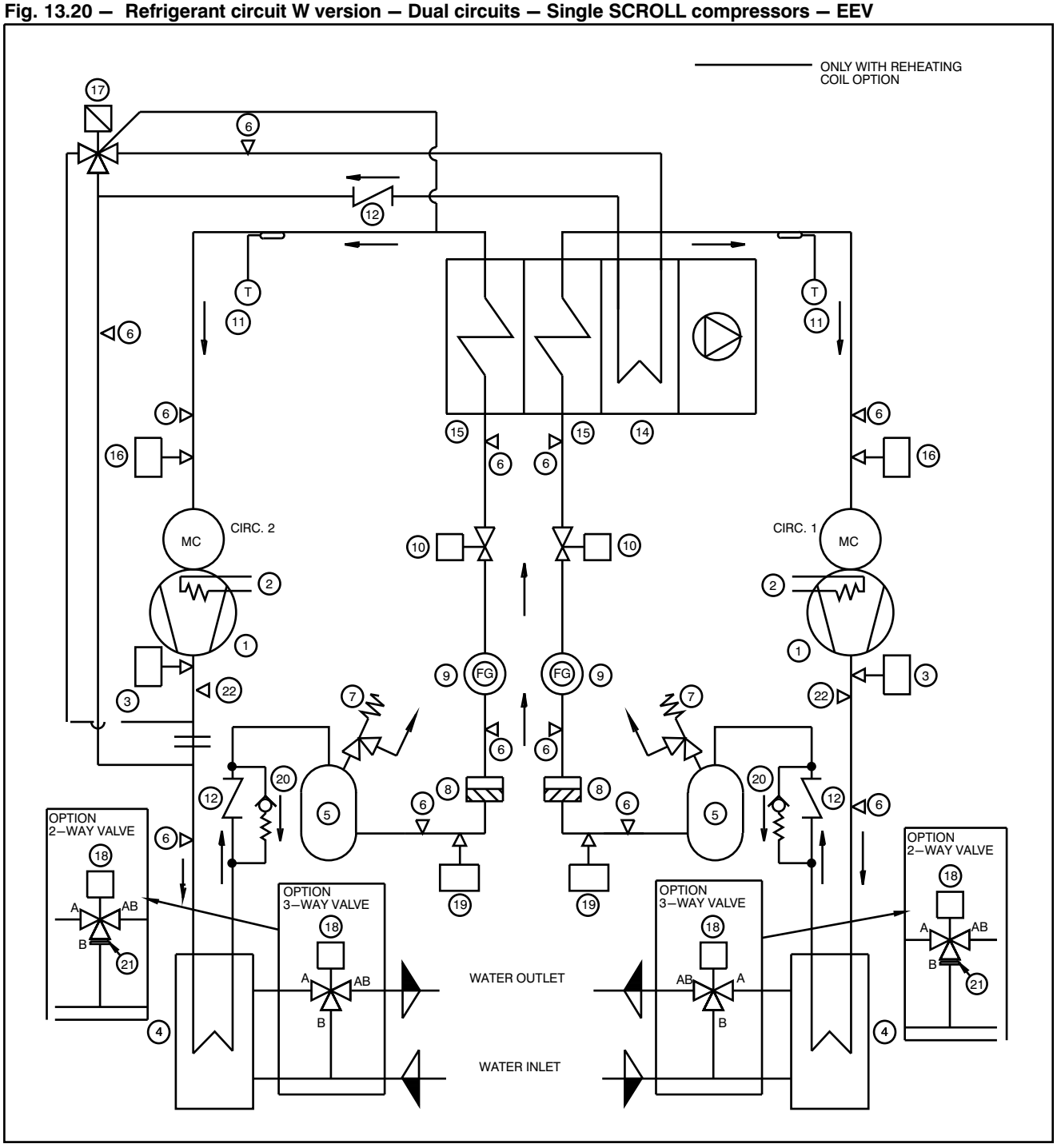


POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Thermostatic expansion valve
11	Shut–off solenoid valve

POS.	DESCRIPTION
12	Check valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Check valve 10 bar (145 psi)
21	Blind disk – only with optional 2–way valve
22	Access valve 1/4

Refrigerant and Hydraulic Circuits

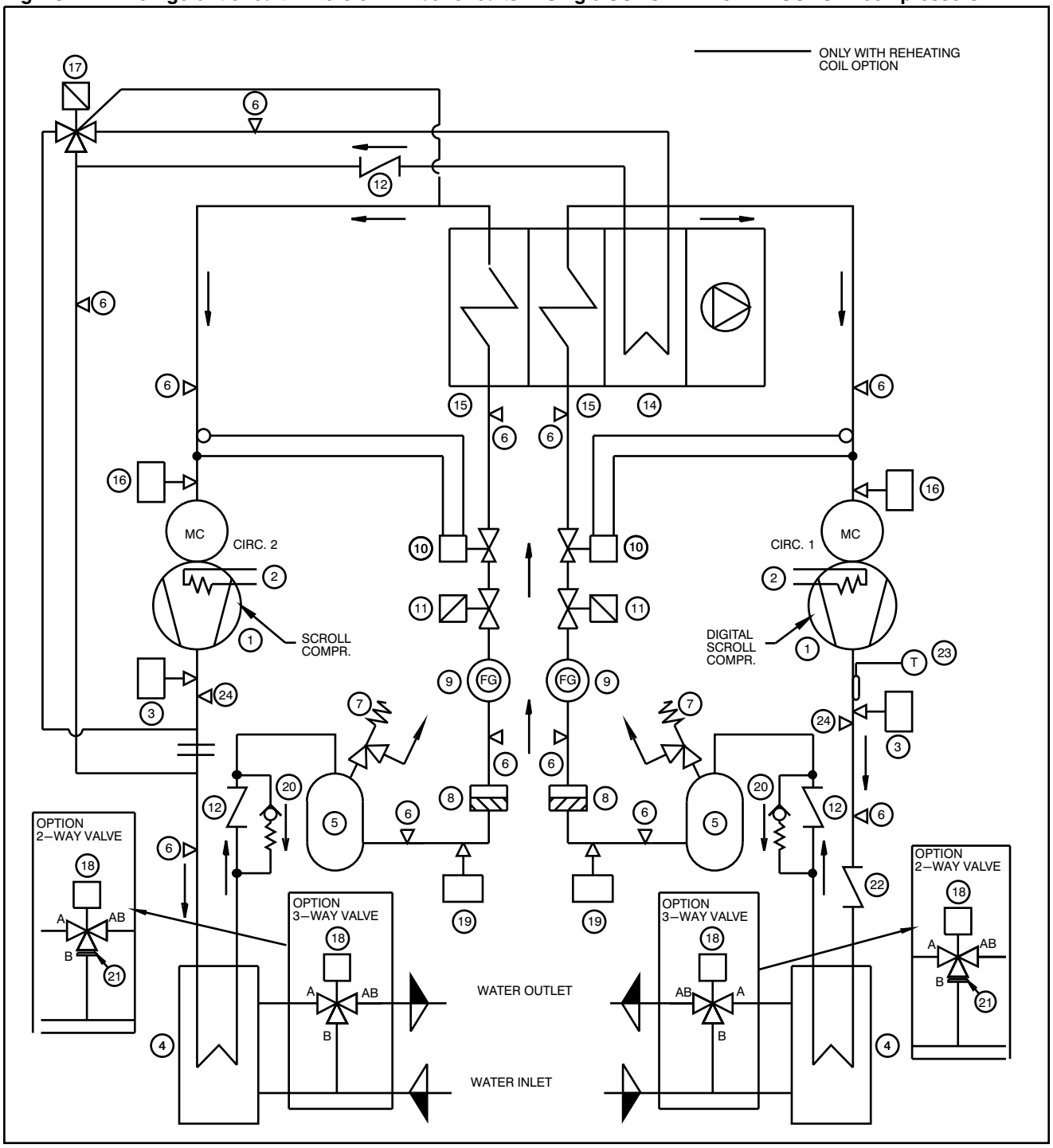
Fig. 13.20 — Refrigerant circuit W version — Dual circuits — Single SCROLL compressors — EEV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV

POS.	DESCRIPTION
12	Check valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Check valve 10 bar (145 psi)
21	Blind disk — only with optional 2–way valve
22	Access valve 1/4

Fig. 13.21 — Refrigerant circuit W version — Dual circuits — Single SCROLL+DIGITAL SCROLL compressors — TXV

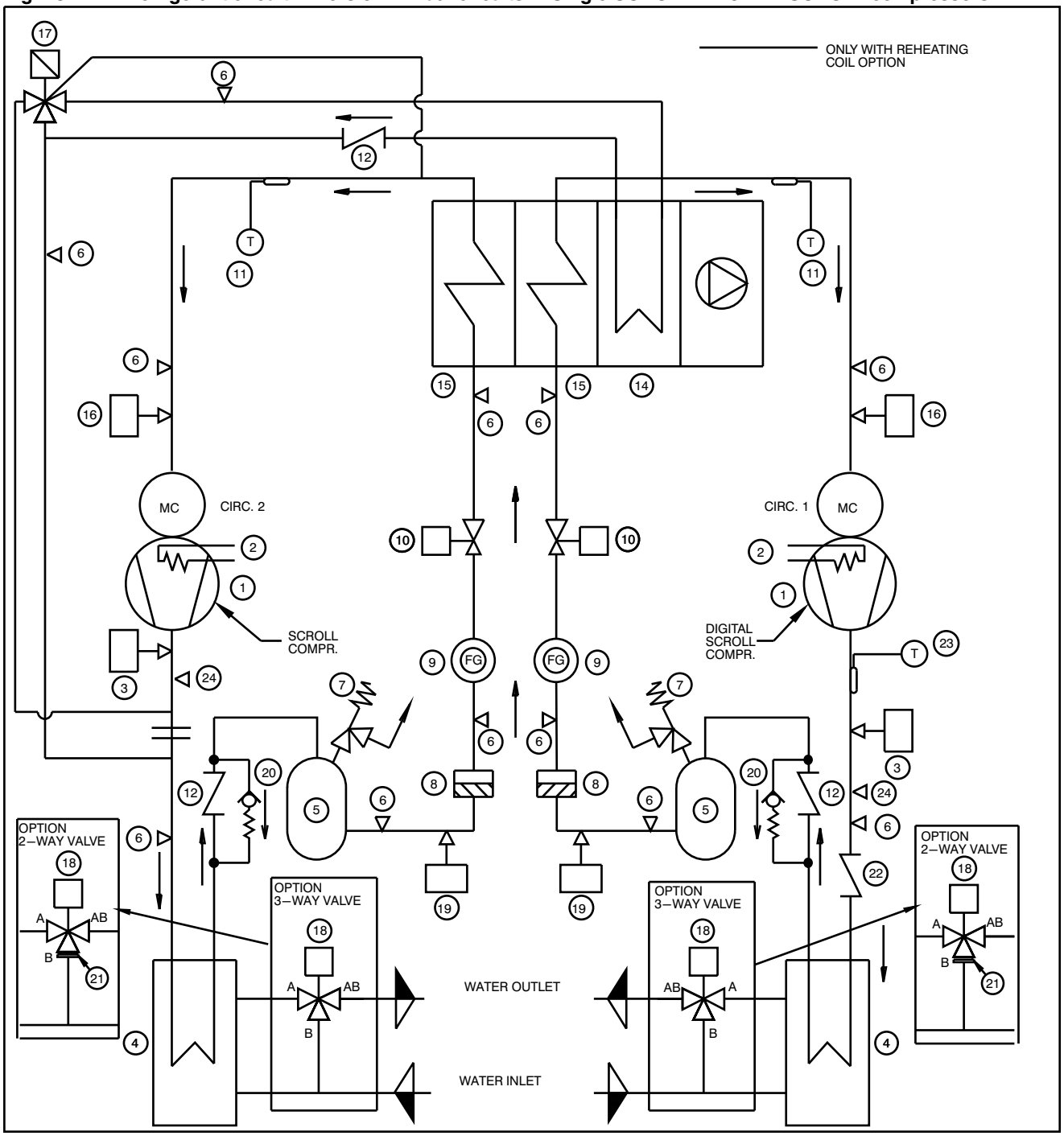


POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Thermostatic expansion valve
11	Shut–off solenoid valve
12	Check valve

POS.	DESCRIPTION
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Check valve 10 bar (145 psi)
21	Blind disk – only with optional 2–way valve
22	Check valve for PX044–054
23	NTC Temperature sensor for DIGITAL SCROLL compressor
24	Access valve 1/4

Refrigerant and Hydraulic Circuits

Fig. 13.22 — Refrigerant circuit W version — Dual circuits — Single SCROLL+DIGITAL SCROLL compressors — EEV

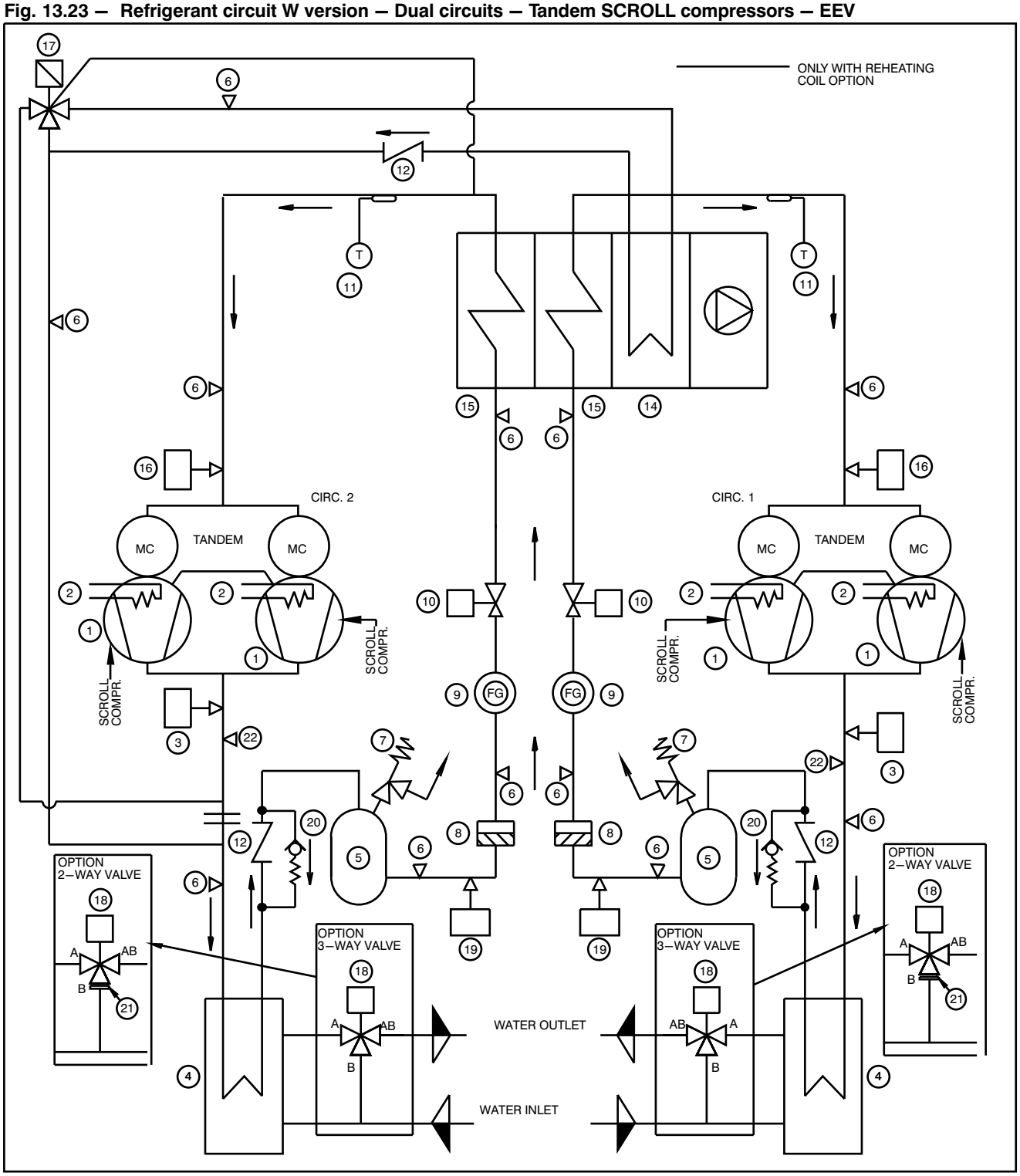


POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV
12	Check valve

POS.	DESCRIPTION
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Check valve 10 bar (145 psi)
21	Blind disk — only with optional 2–way valve
22	Check valve for PX044–054
23	NTC Temperature sensor for DIGITAL SCROLL compressor
24	Access valve 1/4

Refrigerant and Hydraulic Circuits

Fig. 13.23 – Refrigerant circuit W version – Dual circuits – Tandem SCROLL compressors – EEV

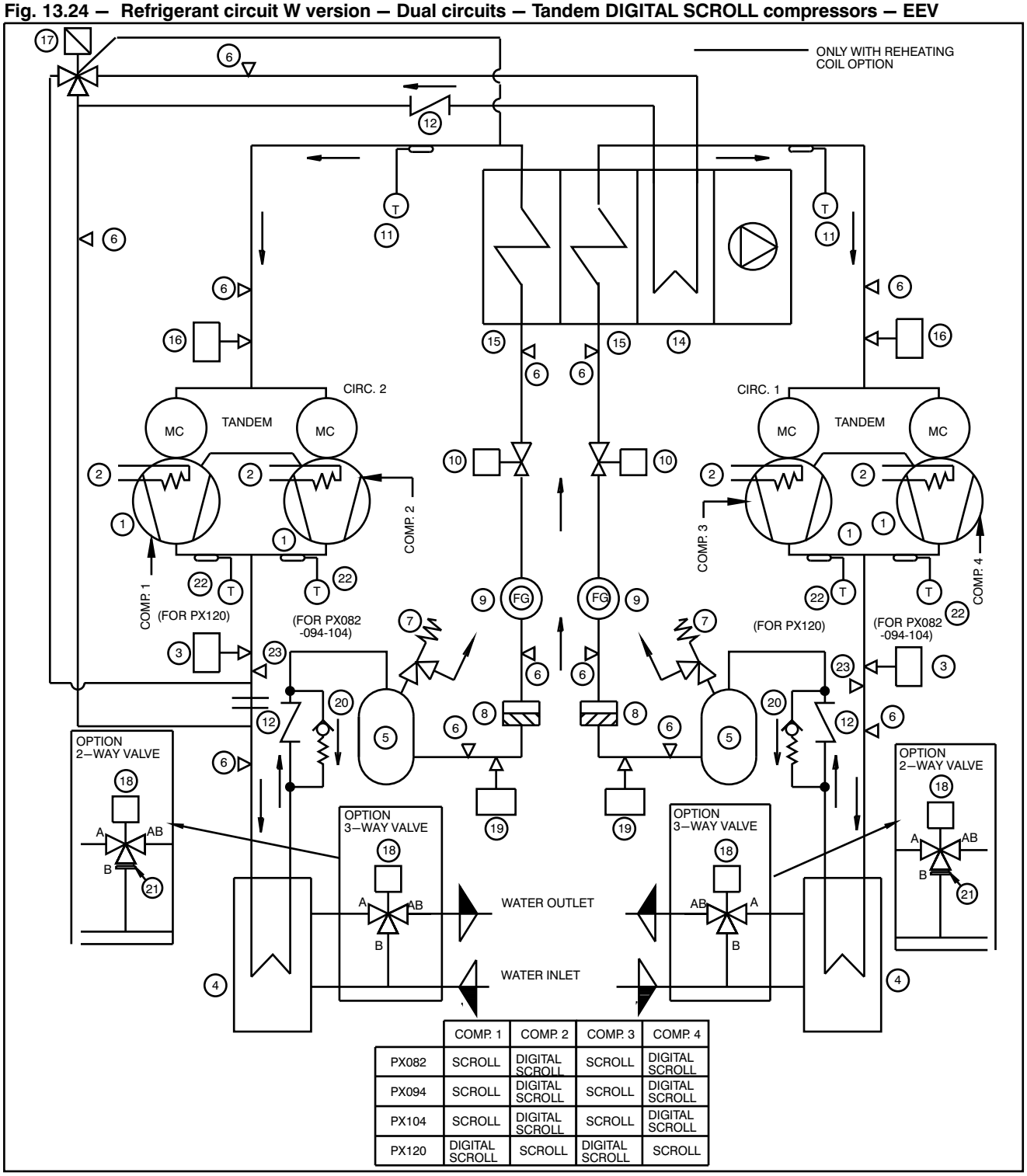


POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV

POS.	DESCRIPTION
12	Check valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Check valve 10 bar (145 psi)
21	Blind disk – only with optional 2–way valve
22	Access valve 1/4

Refrigerant and Hydraulic Circuits

Fig. 13.24 — Refrigerant circuit W version — Dual circuits — Tandem DIGITAL SCROLL compressors — EEV

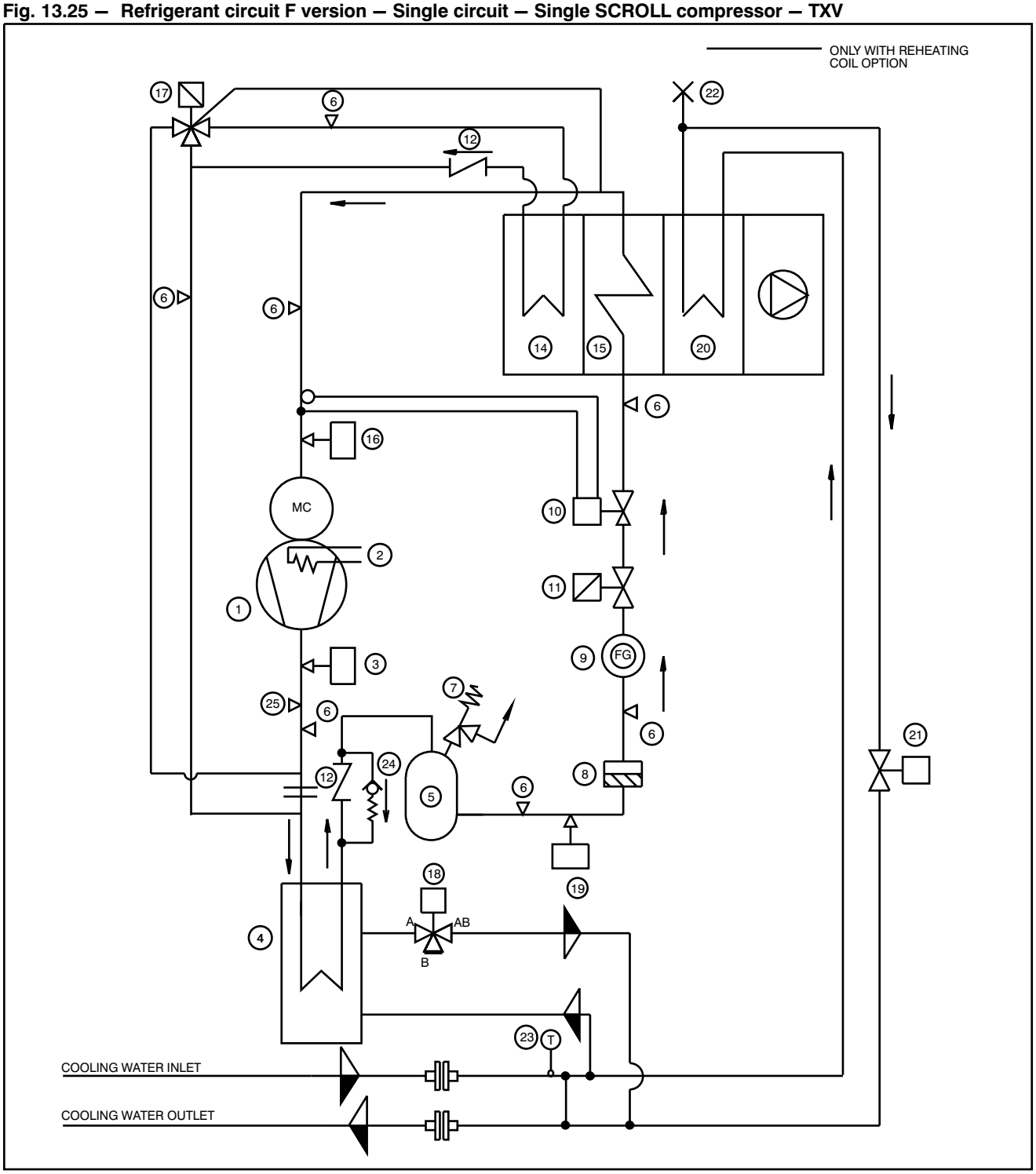


	COMP. 1	COMP. 2	COMP. 3	COMP. 4
PX082	SCROLL	DIGITAL SCROLL	SCROLL	DIGITAL SCROLL
PX094	SCROLL	DIGITAL SCROLL	SCROLL	DIGITAL SCROLL
PX104	SCROLL	DIGITAL SCROLL	SCROLL	DIGITAL SCROLL
PX120	DIGITAL SCROLL	SCROLL	DIGITAL SCROLL	SCROLL

POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV

POS.	DESCRIPTION
12	Check valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Check valve 10 bar (145 psi)
21	Blind disk — only with optional 2–way valve
22	NTC Temperature sensor for DIGITAL SCROLL compressor
23	Access valve 1/4

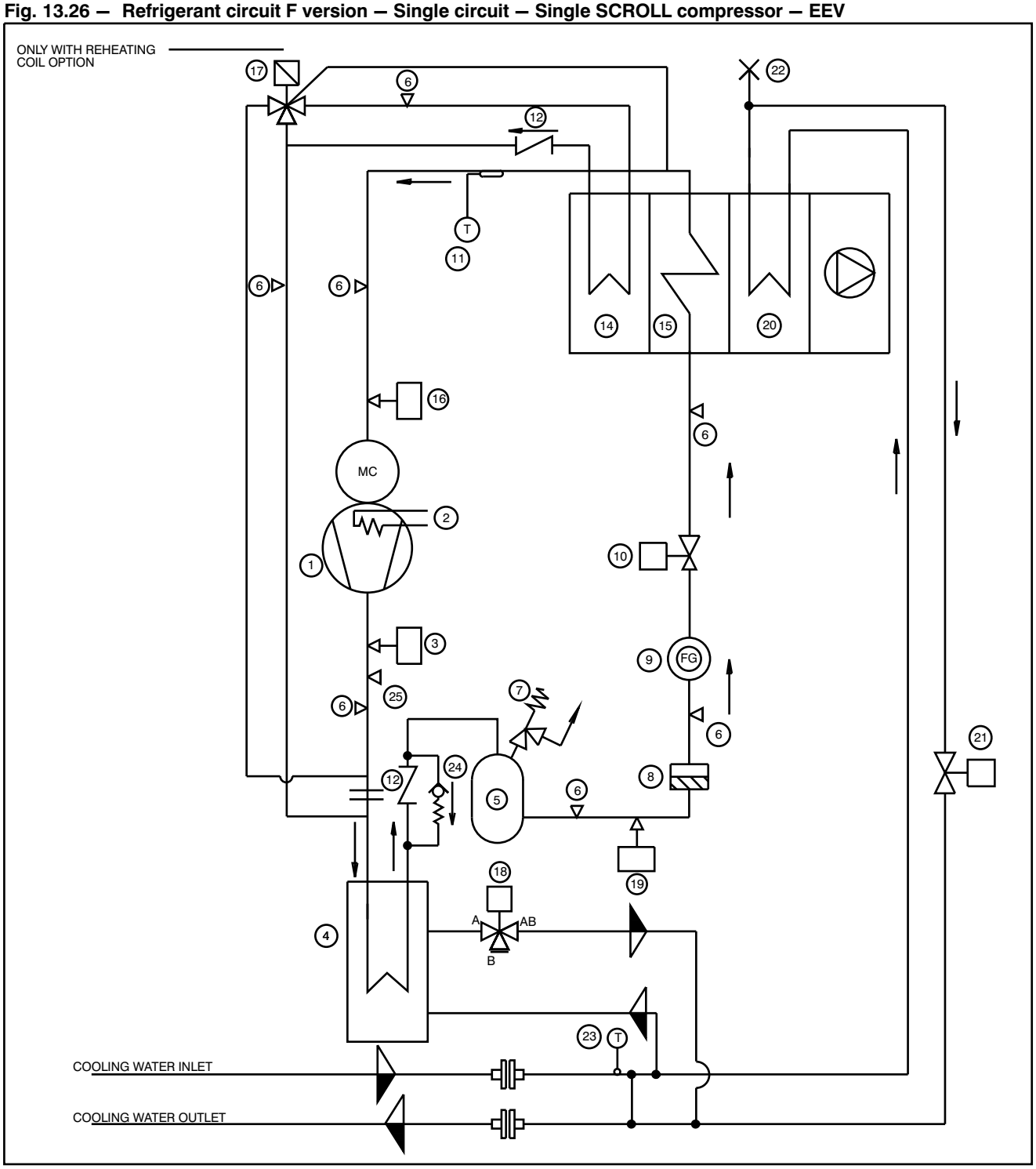
Fig. 13.25 — Refrigerant circuit F version — Single circuit — Single SCROLL compressor — TXV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Thermostatic expansion valve
11	Shut−off solenoid valve
12	Check valve

POS.	DESCRIPTION
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Chilled water coil
21	Chilled water 2−way valve
22	Manual bleed valve
23	Inlet water sensor
24	Check valve 10 bar (145 psi)
25	Access valve 1/4

Fig. 13.26 — Refrigerant circuit F version — Single circuit — Single SCROLL compressor — EEV

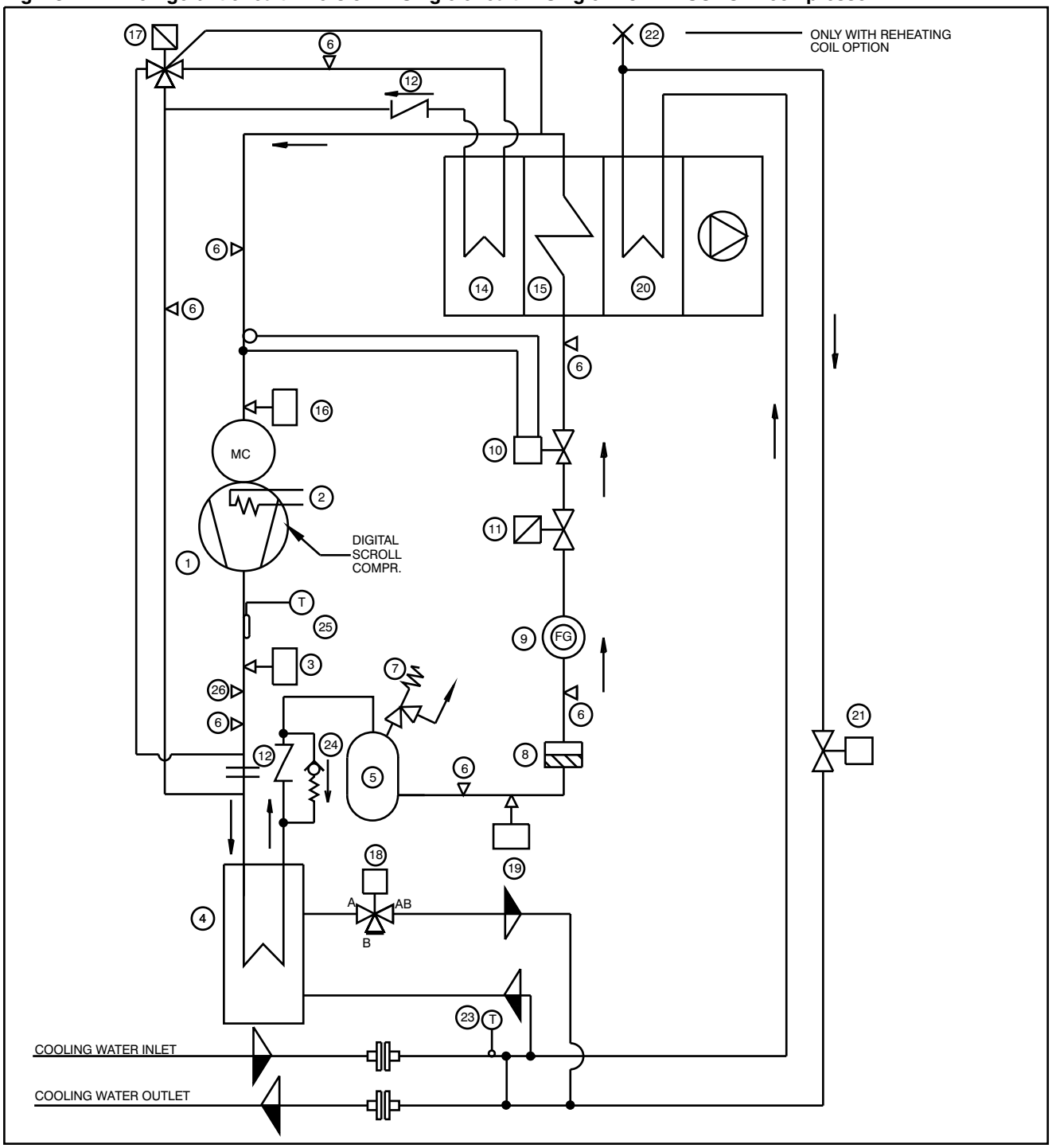


POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV
12	Check valve

POS.	DESCRIPTION
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Chilled water coil
21	Chilled water 2—way valve
22	Manual bleed valve
23	Inlet water sensor
24	Check valve 10 bar (145 psi)
25	Access valve 1/4

Refrigerant and Hydraulic Circuits

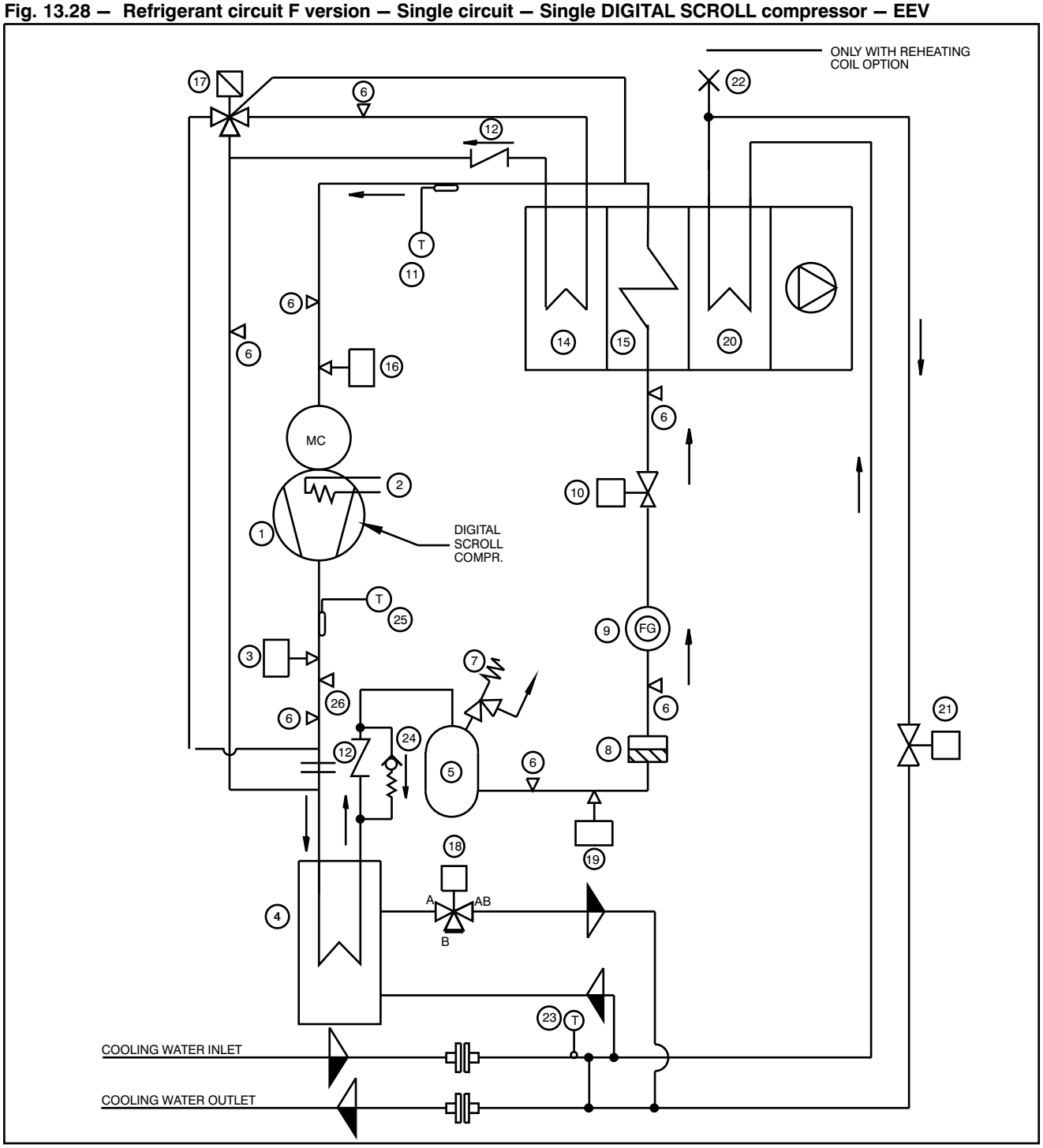
Fig. 13.27 — Refrigerant circuit F version — Single circuit — Single DIGITAL SCROLL compressor — TXV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Thermostatic expansion valve
11	Shut–off solenoid valve
12	Check valve
14	Reheating coil (optional)

POS.	DESCRIPTION
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Chilled water coil
21	Chilled water 2–way valve
22	Manual bleed valve
23	Inlet water sensor
24	Check valve 10 bar (145 psi)
25	NTC Temperature sensor for DIGITAL SCROLL compressor
26	Access valve 1/4

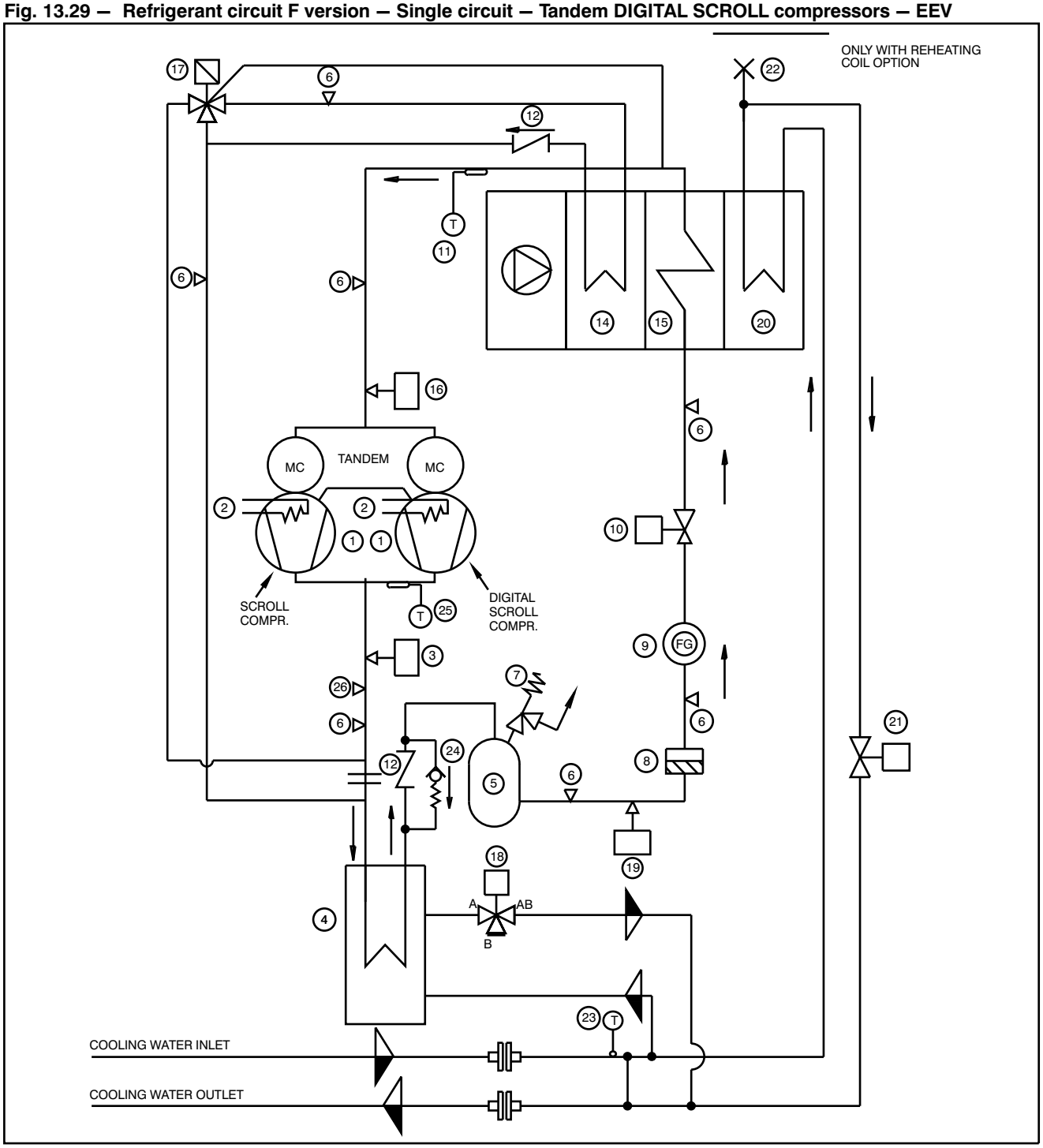
Fig. 13.28 — Refrigerant circuit F version — Single circuit — Single DIGITAL SCROLL compressor — EEV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV
12	Check valve
14	Reheating coil (optional)

POS.	DESCRIPTION
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Chilled water coil
21	Chilled water 2–way valve
22	Manual bleed valve
23	Inlet water sensor
24	Check valve 10 bar (145 psi)
25	NTC Temperature sensor for DIGITAL SCROLL compressor
26	Access valve 1/4

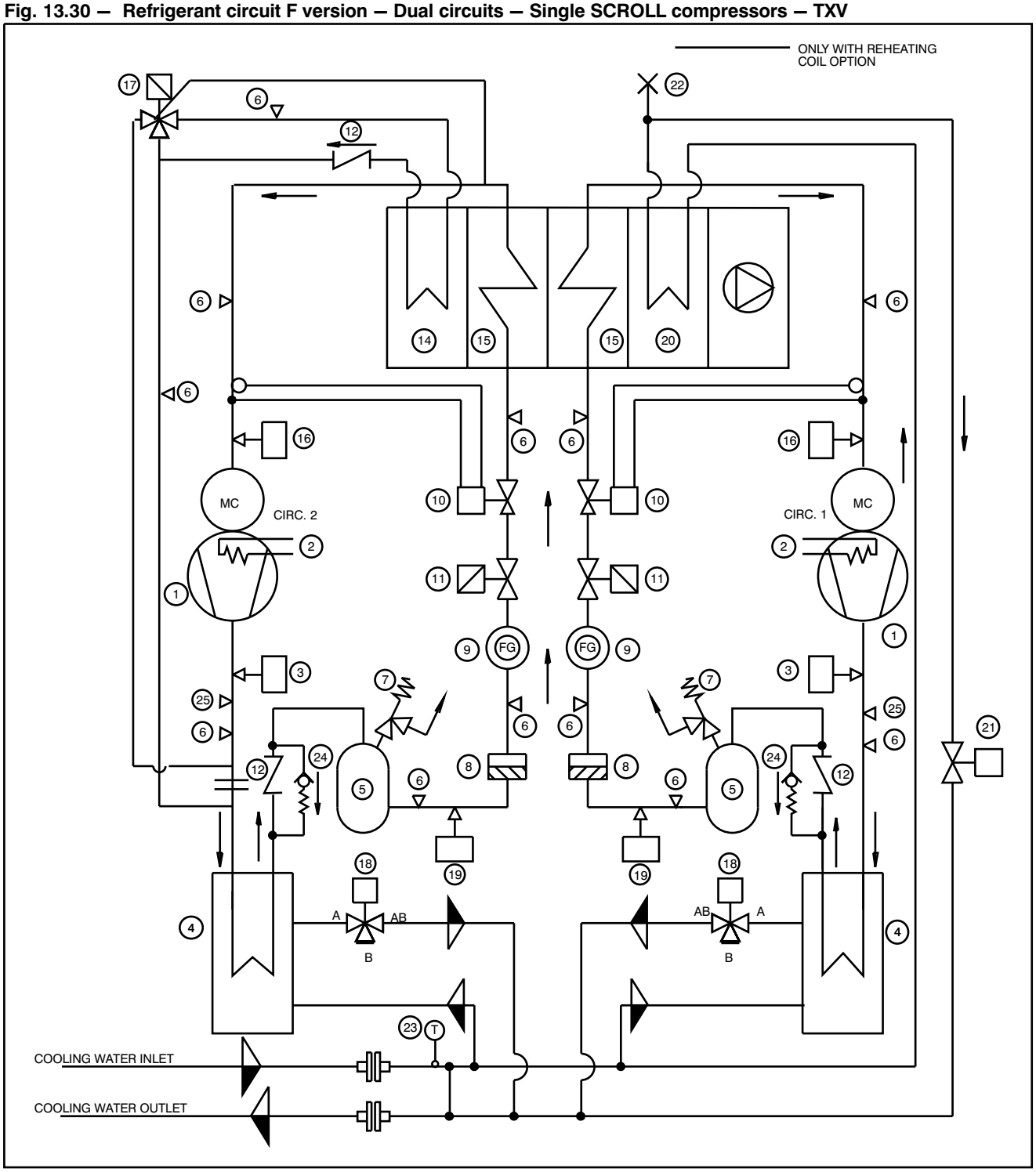
Fig. 13.29 — Refrigerant circuit F version — Single circuit — Tandem DIGITAL SCROLL compressors — EEV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV
12	Check valve
14	Reheating coil (optional)

POS.	DESCRIPTION
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Chilled water coil
21	Chilled water 2–way valve
22	Manual bleed valve
23	Inlet water sensor
24	Check valve 10 bar (145 psi)
25	NTC Temperature sensor for DIGITAL SCROLL compressor
26	Access valve 1/4

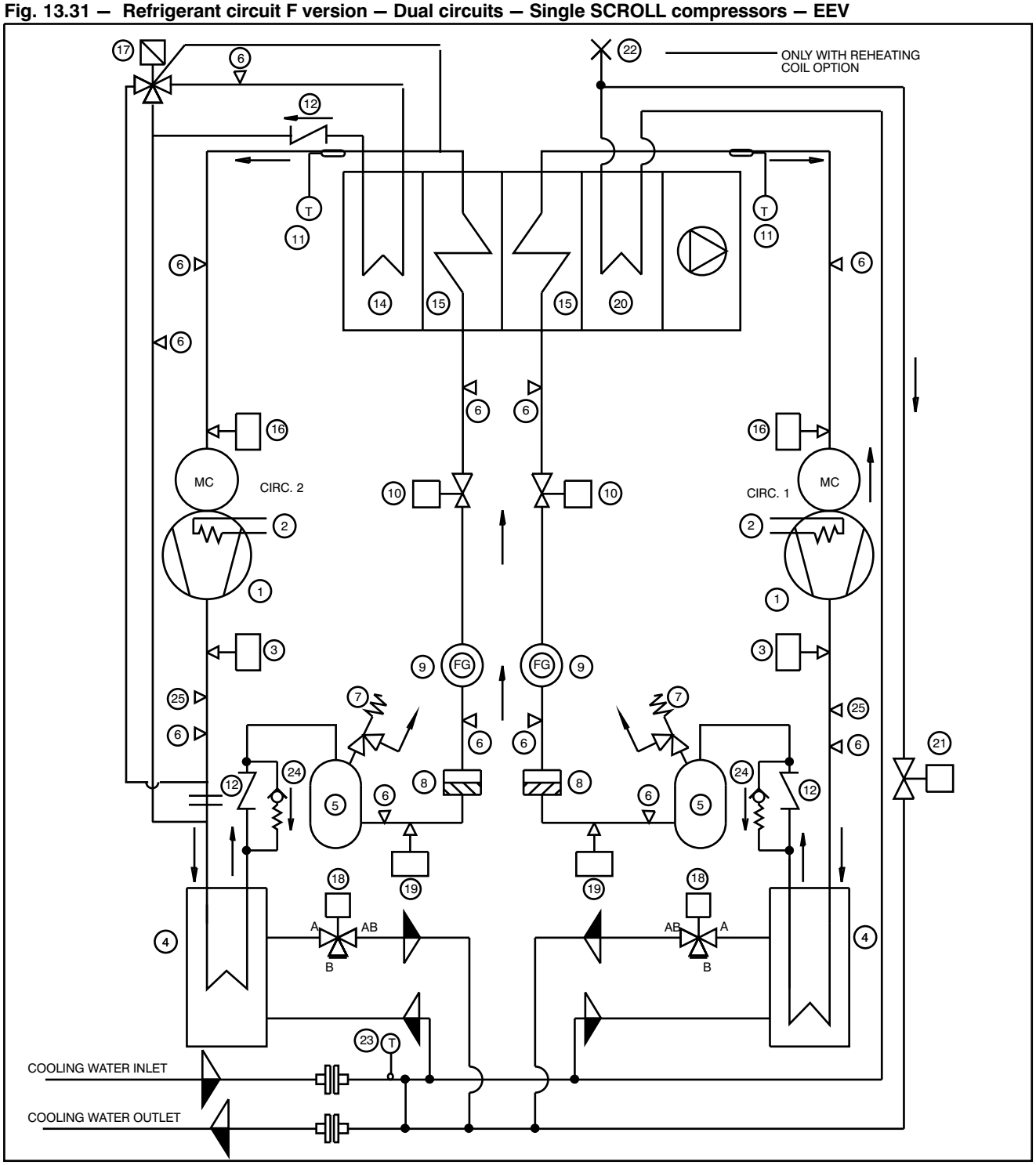
Fig. 13.30 — Refrigerant circuit F version — Dual circuits — Single SCROLL compressors — TXV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Thermostatic expansion valve
11	Shut–off solenoid valve
12	Check valve

POS.	DESCRIPTION
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Chilled water coil
21	Chilled water 2–way valve
22	Manual bleed valve
23	Inlet water sensor
24	Check valve 10 bar (145 psi)
25	Access valve 1/4

Fig. 13.31 — Refrigerant circuit F version — Dual circuits — Single SCROLL compressors — EEV

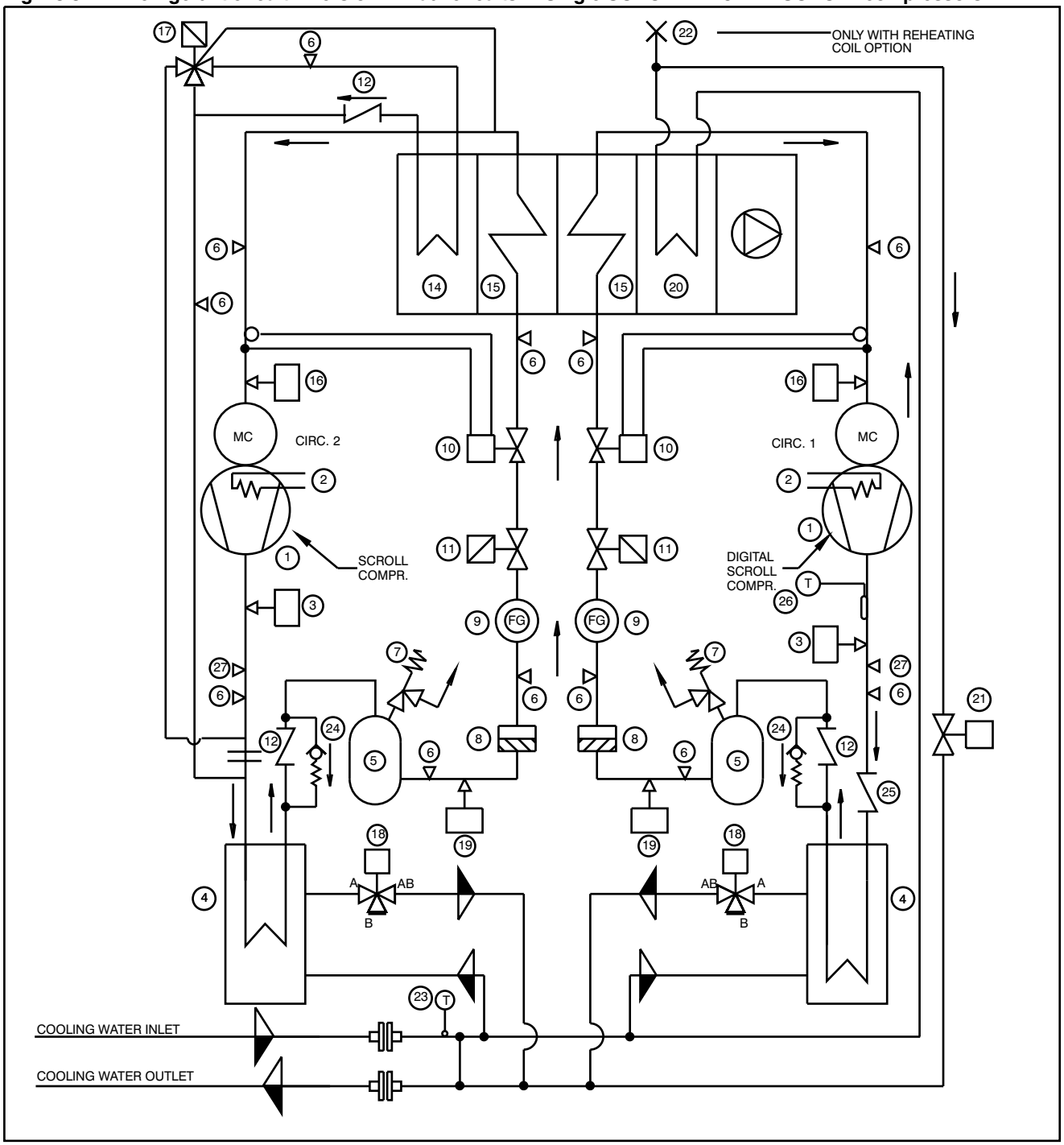


POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV
12	Check valve

POS.	DESCRIPTION
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Chilled water coil
21	Chilled water 2–way valve
22	Manual bleed valve
23	Inlet water sensor
24	Check valve 10 bar (145 psi)
25	Access valve 1/4

Refrigerant and Hydraulic Circuits

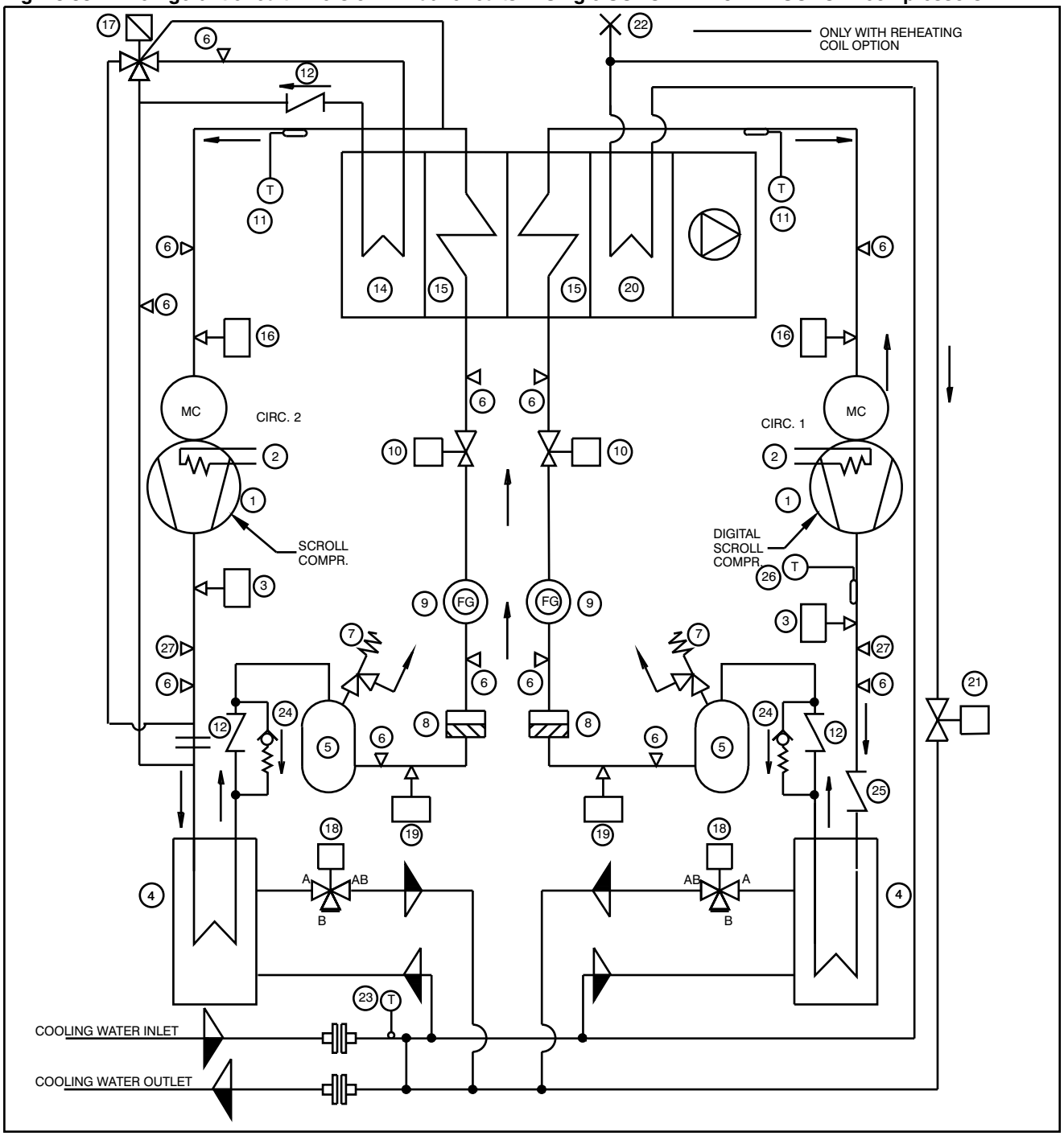
Fig. 13.32 – Refrigerant circuit F version – Dual circuits – Single SCROLL+DIGITAL SCROLL compressors – TXV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Thermostatic expansion valve
11	Shut–off solenoid valve
12	Check valve
14	Reheating coil (optional)

POS.	DESCRIPTION
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Chilled water coil
21	Chilled water 2–way valve
22	Manual bleed valve
23	Inlet water sensor
24	Check valve 10 bar (145 psi)
25	Check valve for PX044–054
26	NTC Temperature sensor for DIGITAL SCROLL compressor
27	Access valve 1/4

Fig. 13.33 – Refrigerant circuit F version – Dual circuits – Single SCROLL+DIGITAL SCROLL compressors – EEV

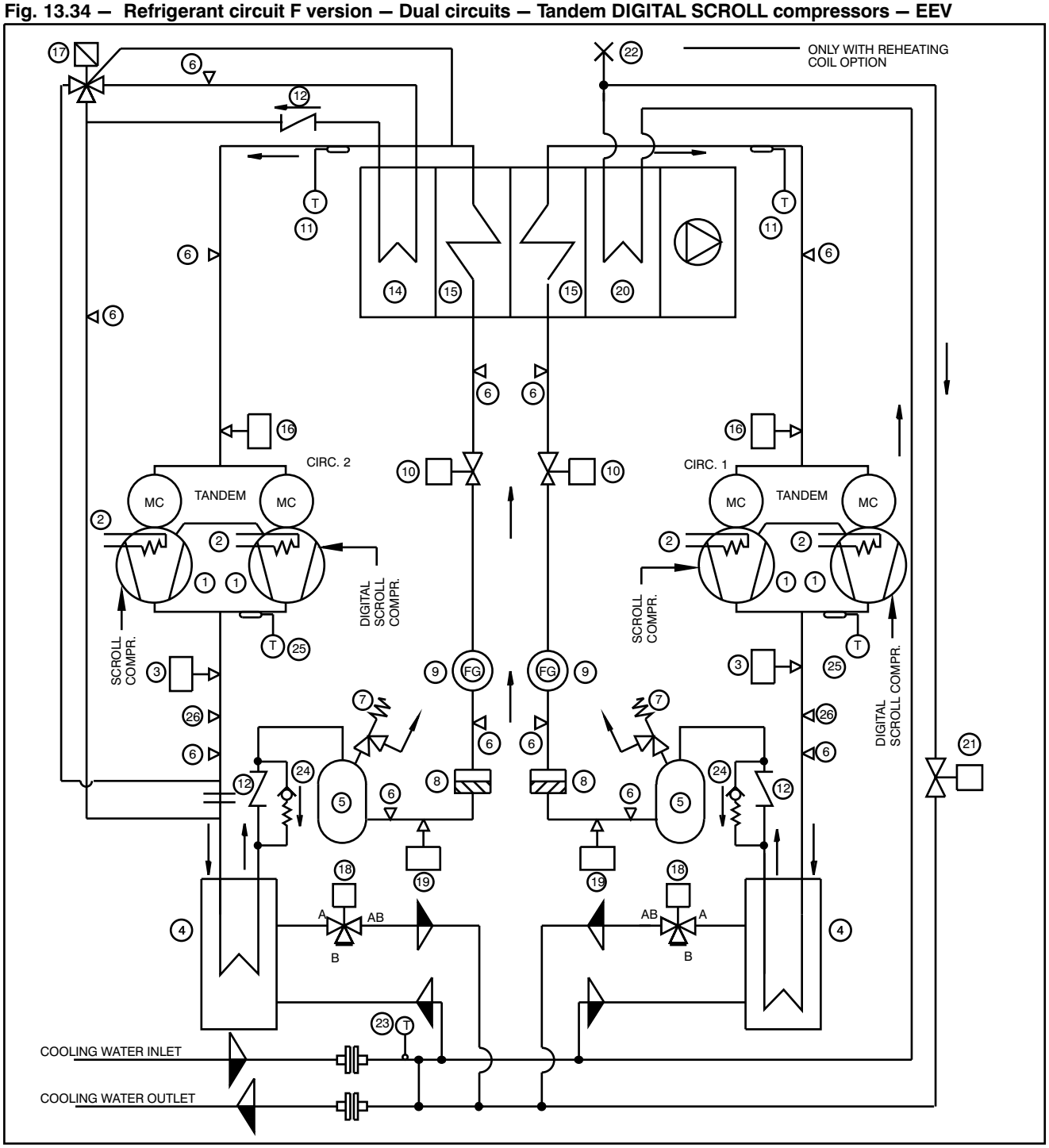


POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV
12	Check valve
14	Reheating coil (optional)

POS.	DESCRIPTION
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Chilled water coil
21	Chilled water 2–way valve
22	Manual bleed valve
23	Inlet water sensor
24	Check valve 10 bar (145 psi)
25	Check valve for PX044–054
26	NTC Temperature sensor for DIGITAL SCROLL compressor
27	Access valve 1/4

Refrigerant and Hydraulic Circuits

Fig. 13.34 — Refrigerant circuit F version — Dual circuits — Tandem DIGITAL SCROLL compressors — EEV

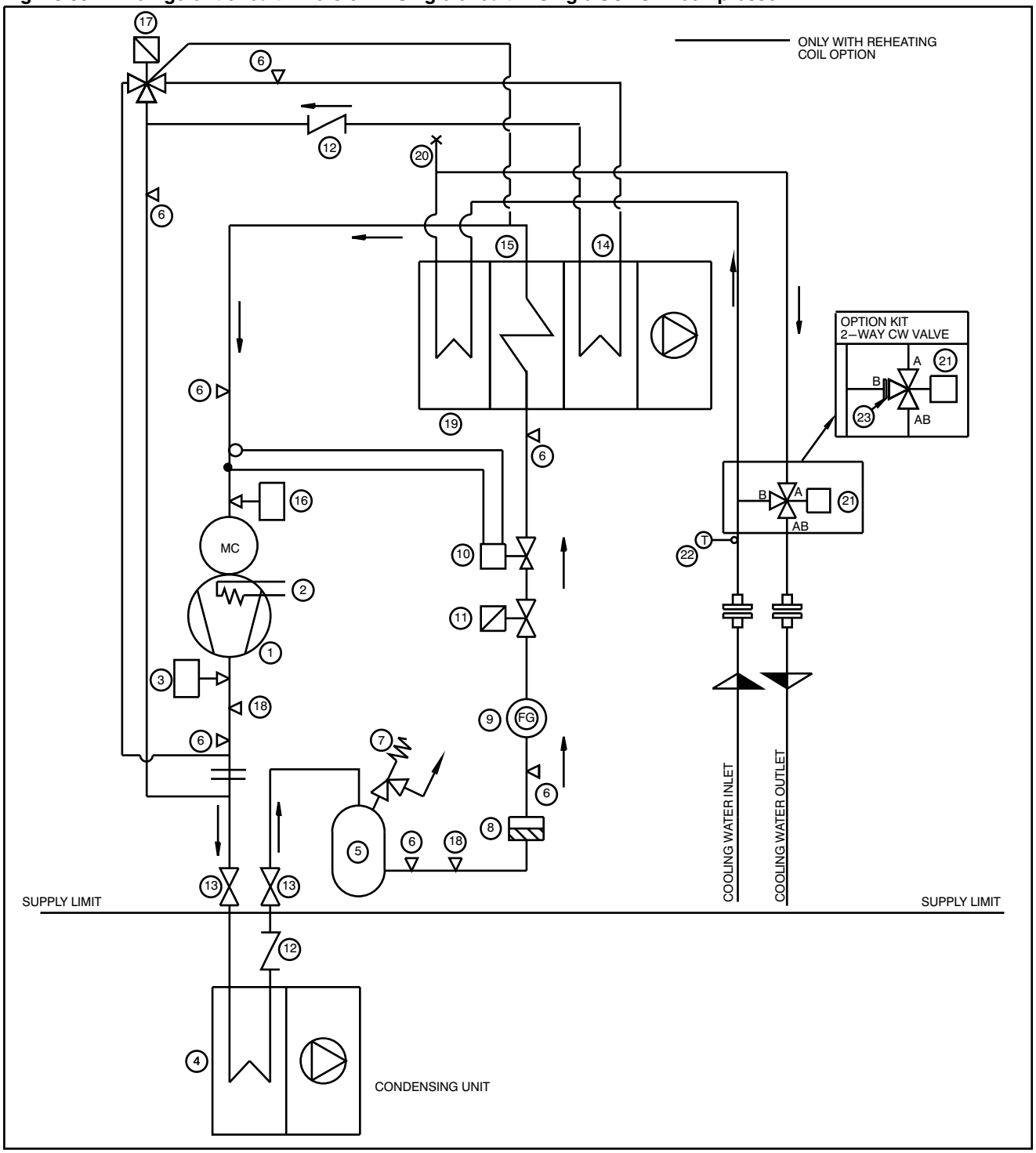


POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV
12	Check valve
14	Reheating coil (optional)

POS.	DESCRIPTION
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Chilled water coil
21	Chilled water 2–way valve
22	Manual bleed valve
23	Inlet water sensor
24	Check valve 10 bar (145 psi)
25	NTC Temperature sensor for DIGITAL SCROLL compressor
26	Access valve 1/4

Refrigerant and Hydraulic Circuits

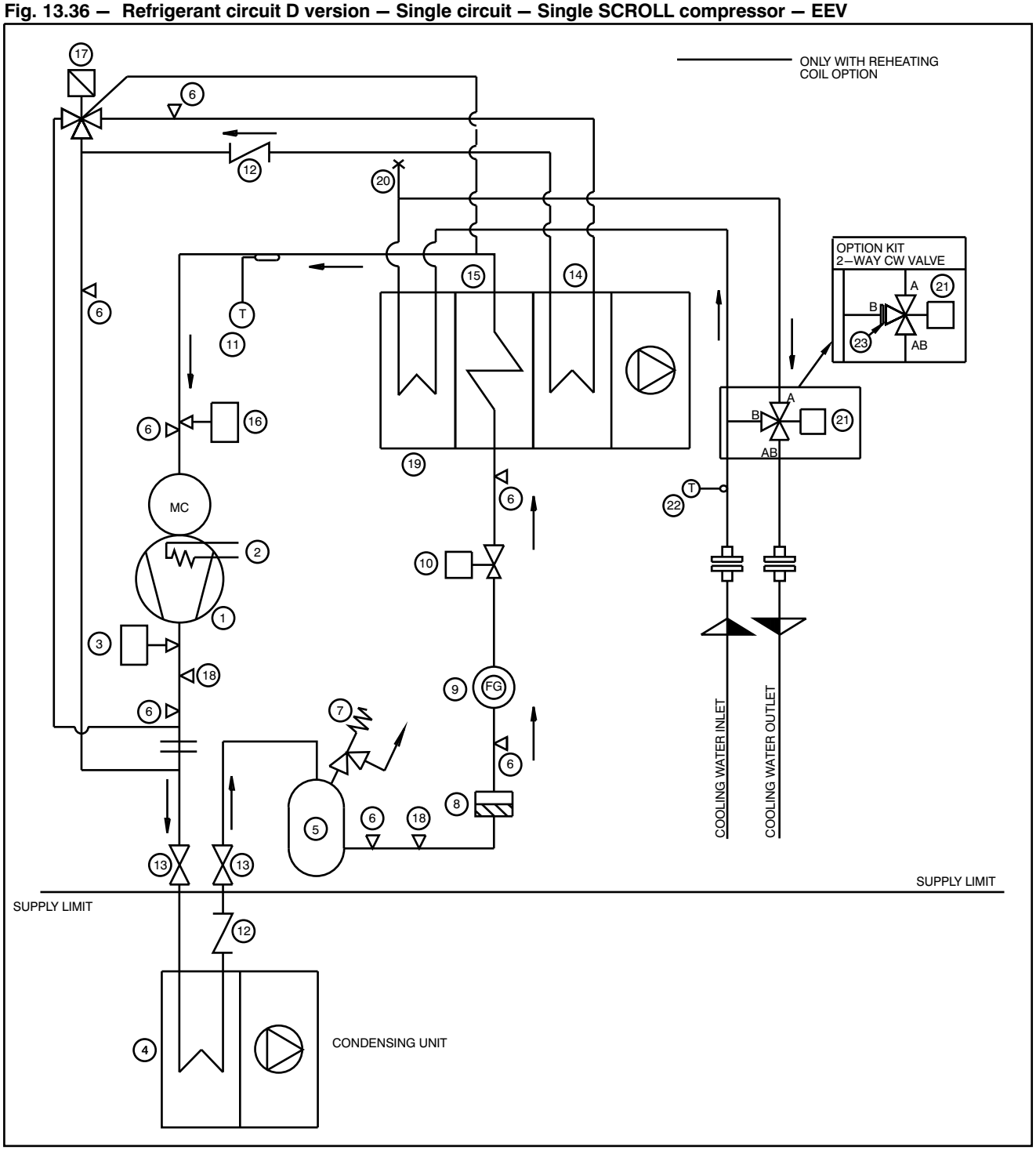
Fig. 13.35 — Refrigerant circuit D version — Single circuit — Single SCROLL compressor — TXV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Air cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Thermostatic expansion valve
11	Shut–off solenoid valve
12	Check valve

POS.	DESCRIPTION
13	Shut–off valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Access valve 1/4
19	Chilled water coil
20	Manual bleed valve
21	Chilled water 3–way valve
22	Inlet water sensor
23	Blind disk — only with optional 2–way CW valve

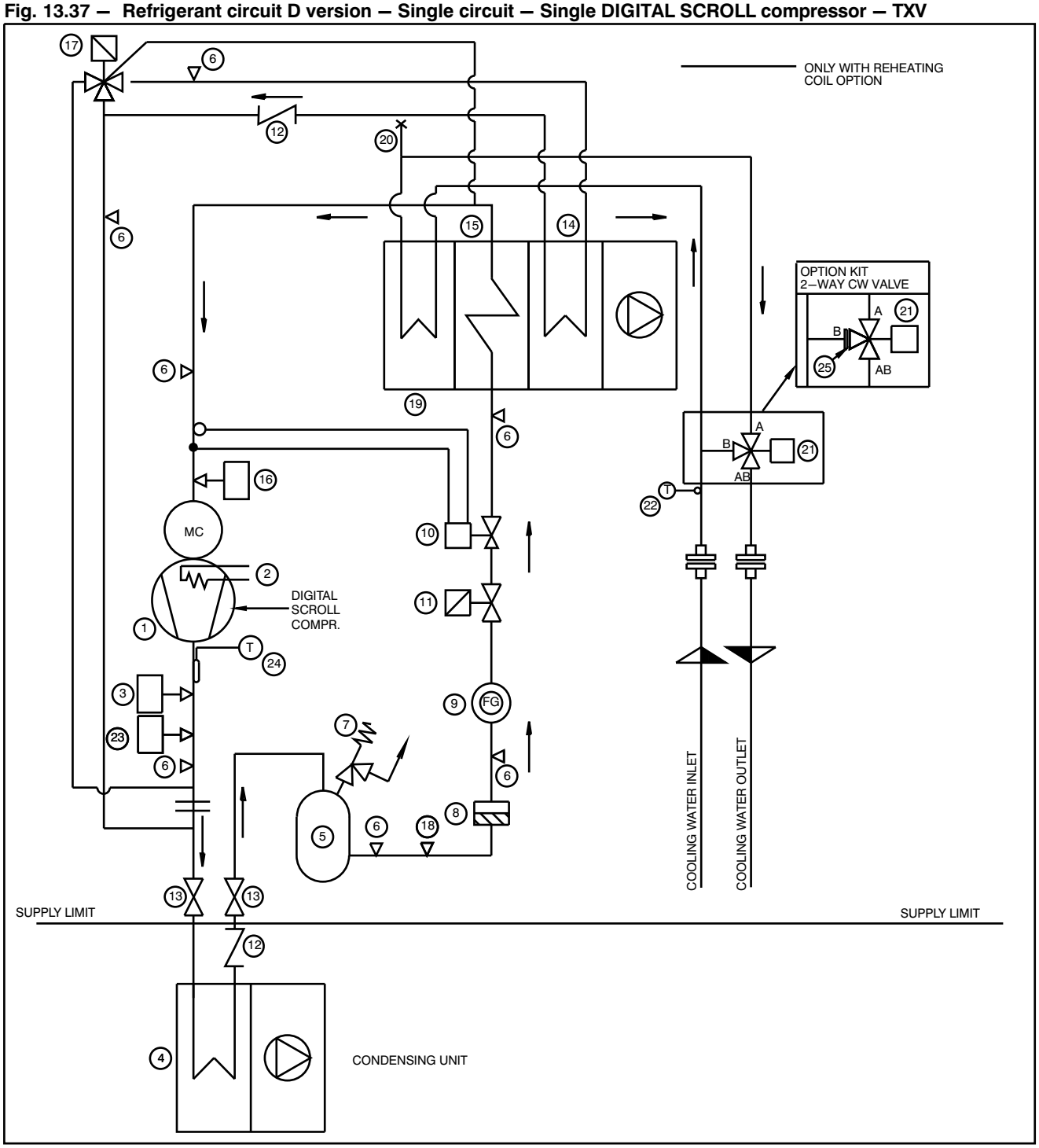
Fig. 13.36 — Refrigerant circuit D version — Single circuit — Single SCROLL compressor — EEV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Air cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV
12	Check valve

POS.	DESCRIPTION
13	Shut—off valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer EEV
17	Reheating solenoid valve (optional)
18	Access valve 1/4
19	Chilled water coil
20	Manual bleed valve
21	Chilled water 3—way valve
22	Inlet water sensor
23	Blind disk — only with optional 2—way CW valve

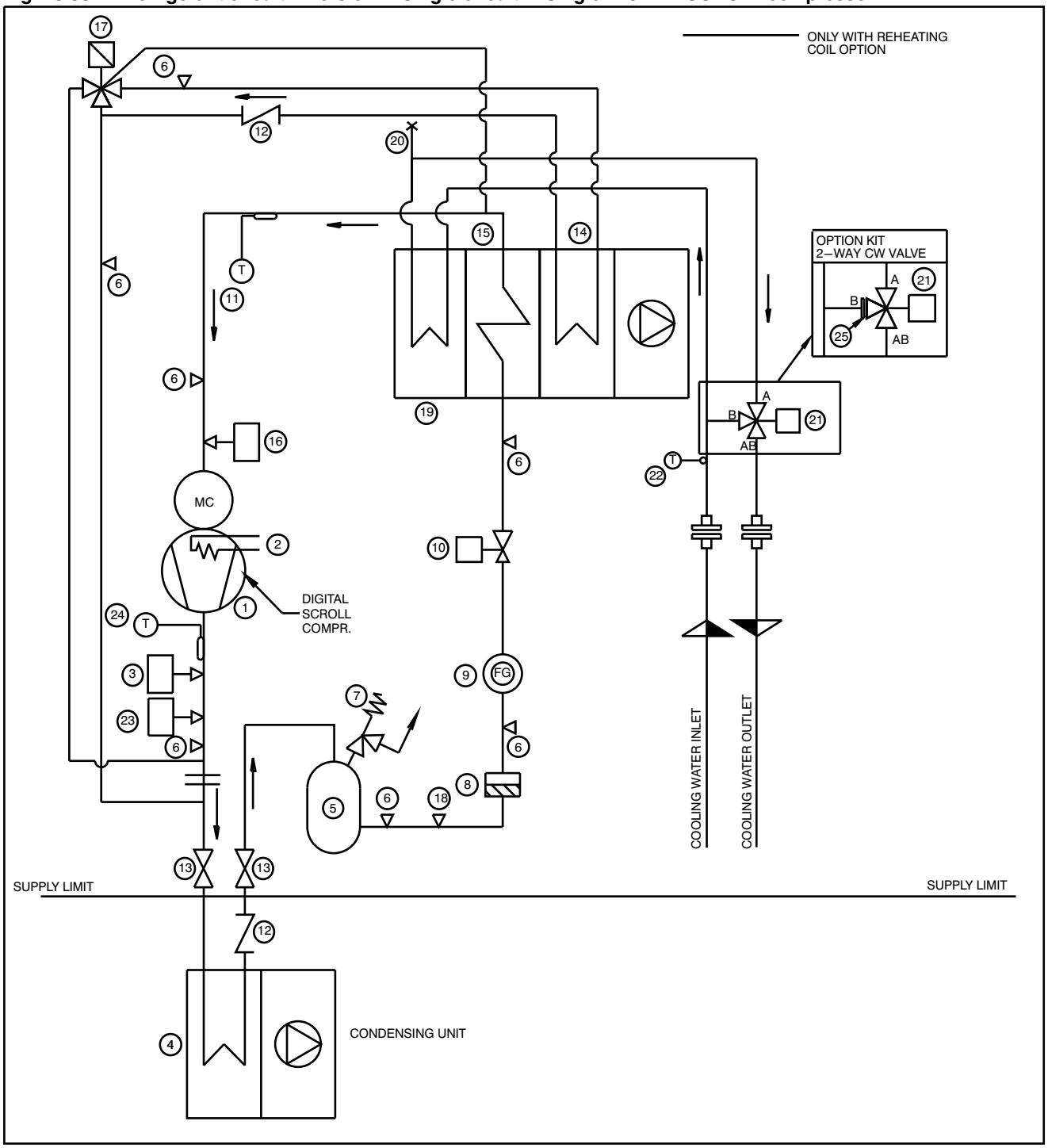
Fig. 13.37 – Refrigerant circuit D version – Single circuit – Single DIGITAL SCROLL compressor – TXV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Air cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Thermostatic expansion valve
11	Shut–off solenoid valve
12	Check valve
13	Shut–off valve

POS.	DESCRIPTION
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Access valve 1/4
19	Chilled water coil
20	Manual bleed valve
21	Chilled water 3–way valve
22	Inlet water sensor
23	High pressure transducer
24	NTC Temperature sensor for DIGITAL SCROLL compressor
25	Blind disk – only with optional 2–way CW valve

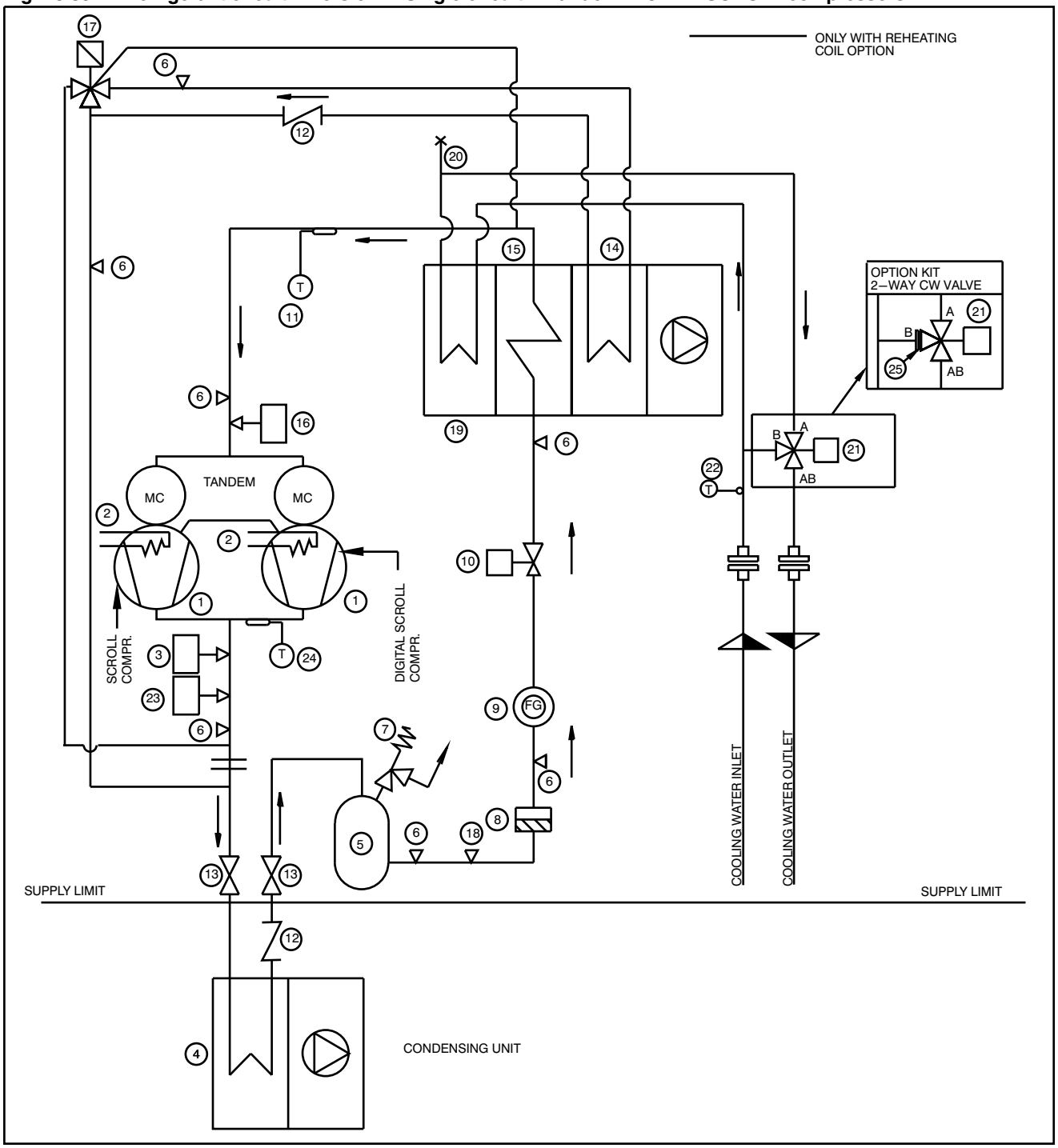
Fig. 13.38 — Refrigerant circuit D version — Single circuit — Single DIGITAL SCROLL compressor — EEV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Air cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV
12	Check valve
13	Shut–off valve

POS.	DESCRIPTION
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer EEV
17	Reheating solenoid valve (optional)
18	Access valve 1/4
19	Chilled water coil
20	Manual bleed valve
21	Chilled water 3–way valve
22	Inlet water sensor
23	High pressure transducer
24	NTC Temperature sensor for DIGITAL SCROLL compressor
25	Blind disk – only with optional 2–way CW valve

Fig. 13.39 — Refrigerant circuit D version — Single circuit — Tandem DIGITAL SCROLL compressors — EEV

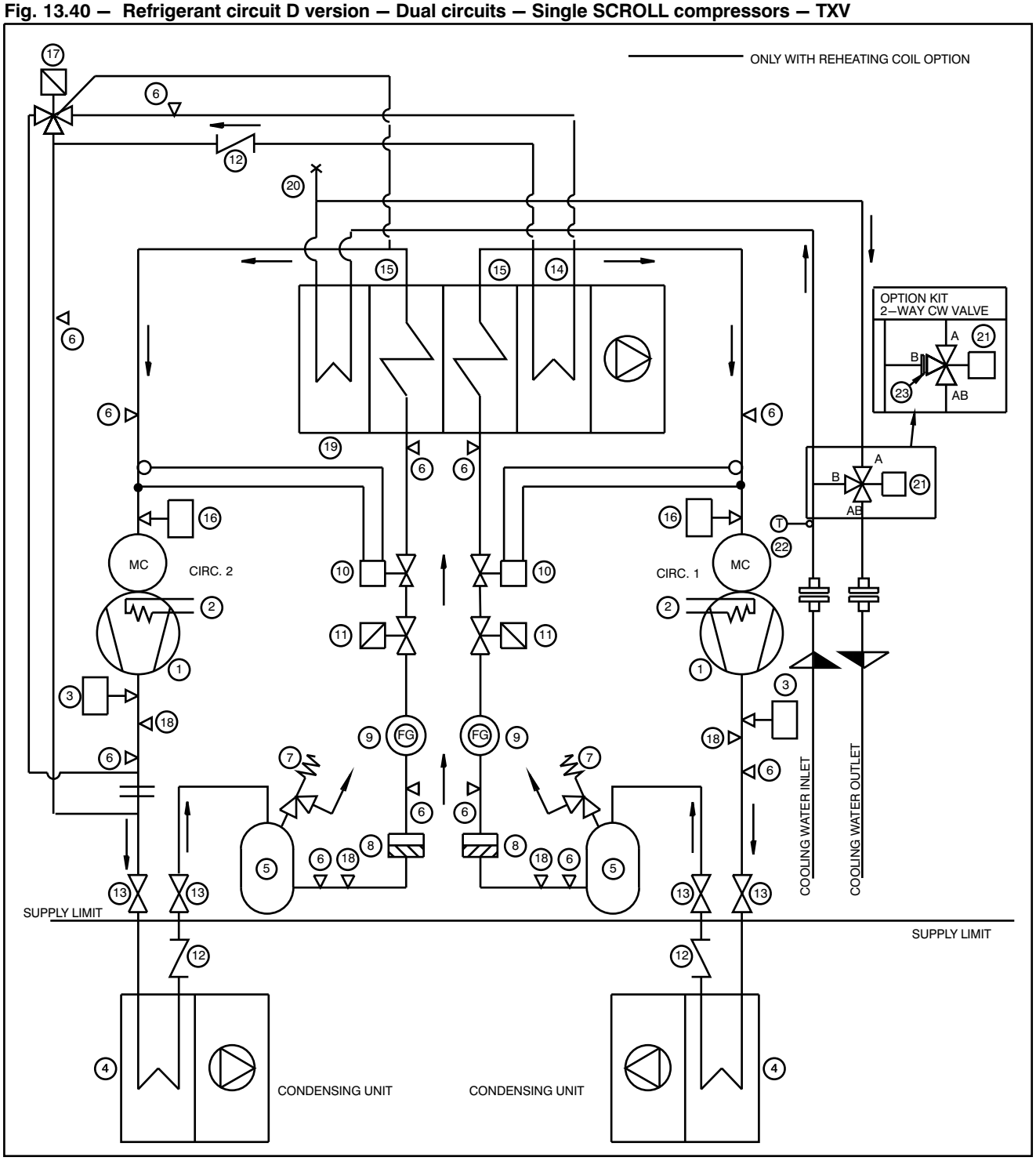


POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Air cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV
12	Check valve
13	Shut—off valve

POS.	DESCRIPTION
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer EEV
17	Reheating solenoid valve (optional)
18	Access valve 1/4
19	Chilled water coil
20	Manual bleed valve
21	Chilled water 3—way valve
22	Inlet water sensor
23	High pressure transducer
24	NTC Temperature sensor for DIGITAL SCROLL compressor
25	Blind disk — only with optional 2—way CW valve

Refrigerant and Hydraulic Circuits

Fig. 13.40 — Refrigerant circuit D version — Dual circuits — Single SCROLL compressors — TXV

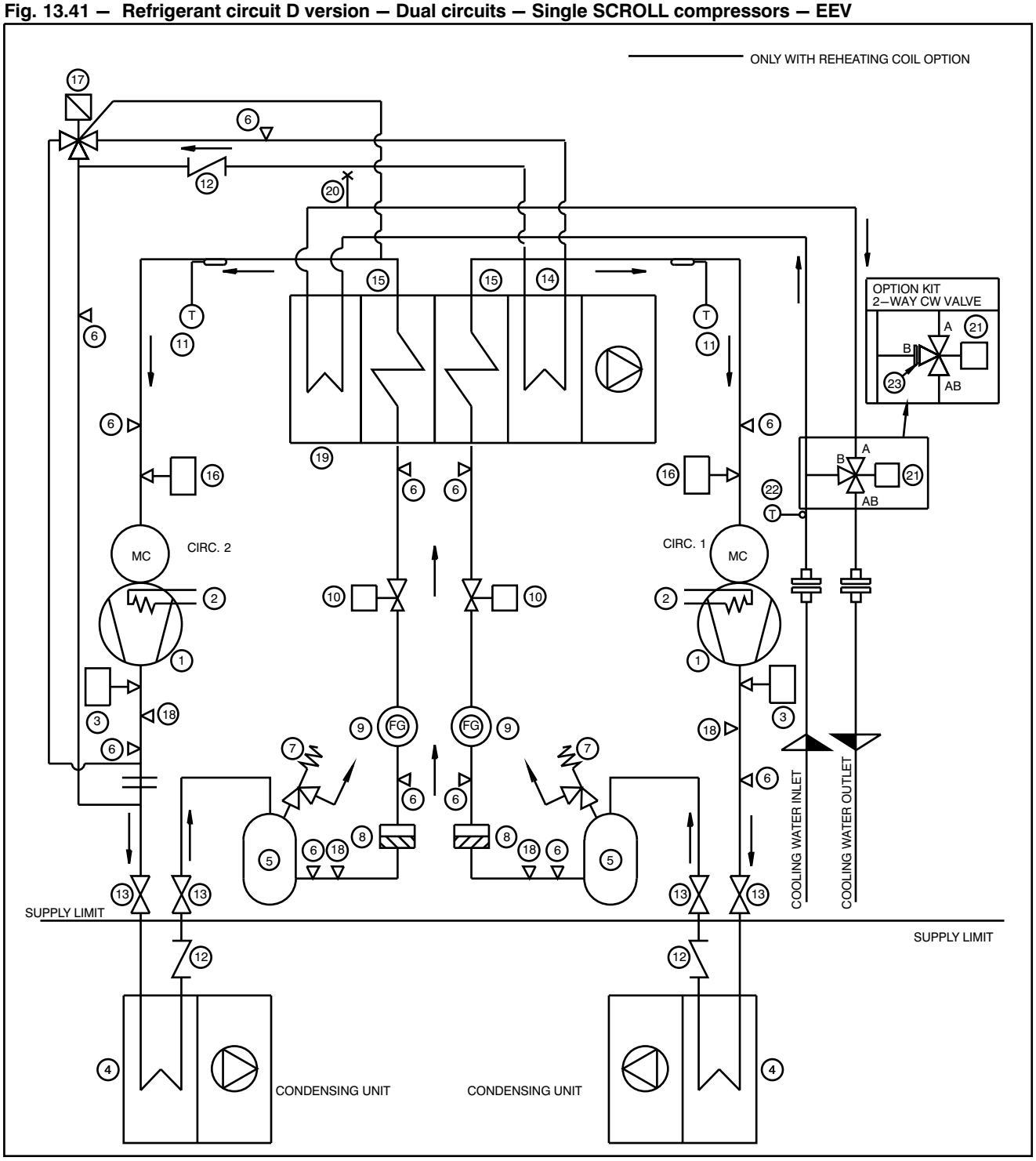


POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Air cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Thermostatic expansion valve
11	Shut—off solenoid valve
12	Check valve

POS.	DESCRIPTION
13	Shut—off valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Access valve 1/4
19	Chilled water coil
20	Manual bleed valve
21	Chilled water 3—way valve
22	Inlet water sensor
23	Blind disk — only with optional 2—way CW valve

Refrigerant and Hydraulic Circuits

Fig. 13.41 — Refrigerant circuit D version — Dual circuits — Single SCROLL compressors — EEV

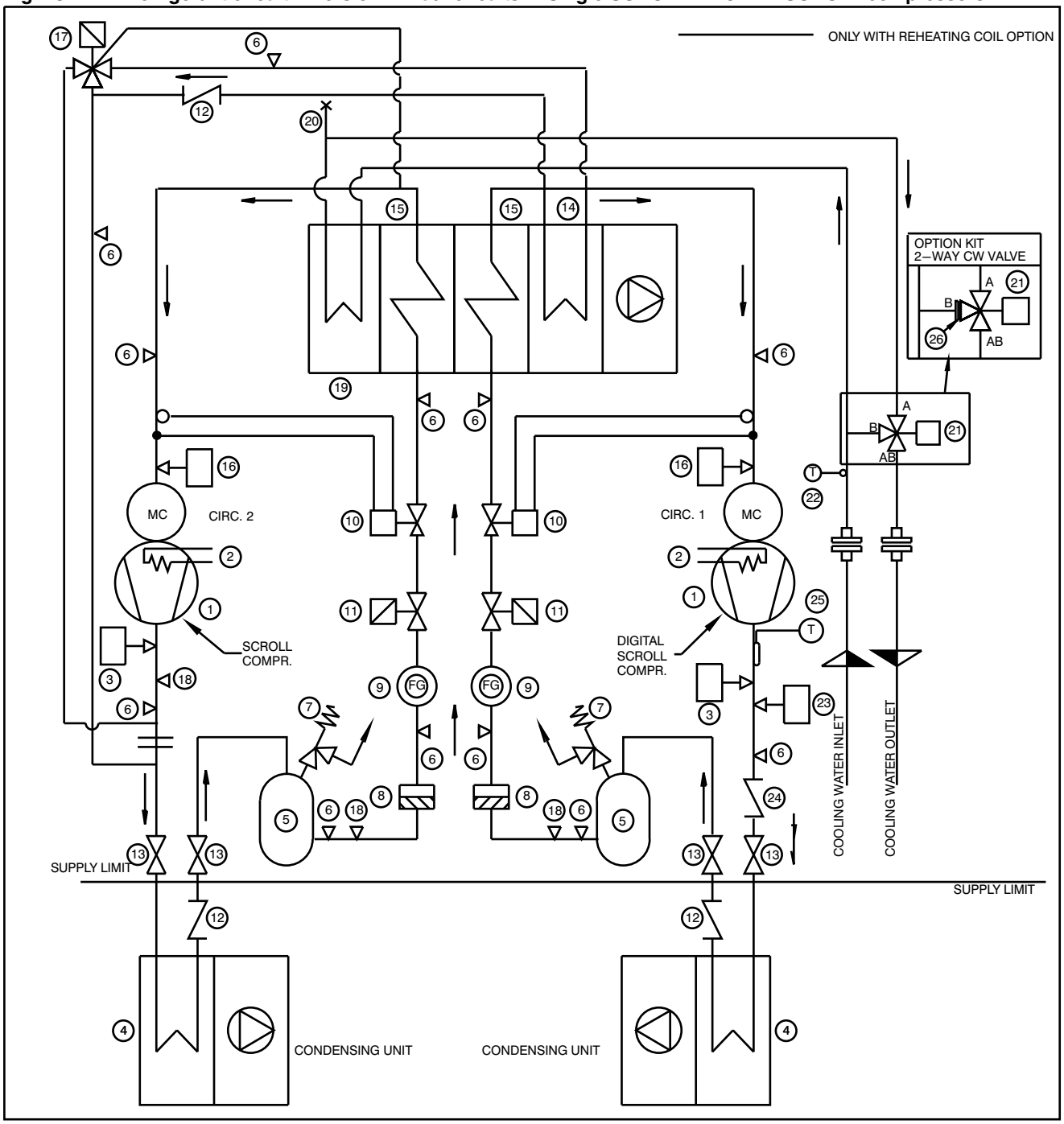


POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Air cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV
12	Check valve

POS.	DESCRIPTION
13	Shut–off valve
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer EEV
17	Reheating solenoid valve (optional)
18	Access valve 1/4
19	Chilled water coil
20	Manual bleed valve
21	Chilled water 3–way valve
22	Inlet water sensor
23	Blind disk – only with optional 2–way CW valve

Refrigerant and Hydraulic Circuits

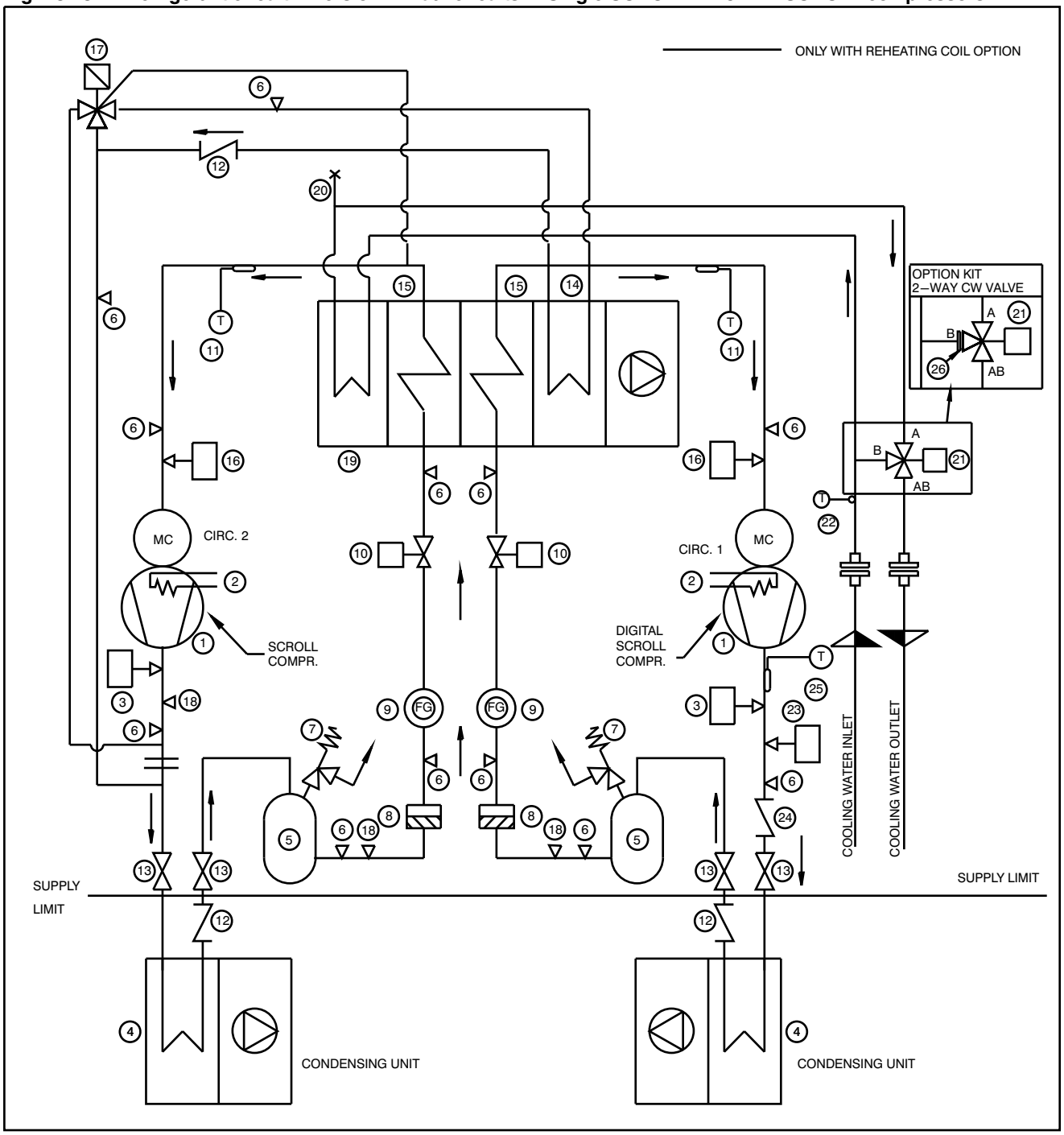
Fig. 13.42 — Refrigerant circuit D version — Dual circuits — Single SCROLL+DIGITAL SCROLL compressors — TXV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Air cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Thermostatic expansion valve
11	Shut–off solenoid valve
12	Check valve
13	Shut–off valve
14	Reheating coil (optional)

POS.	DESCRIPTION
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Access valve 1/4
19	Chilled water coil
20	Manual bleed valve
21	Chilled water 3–way valve
22	Inlet water sensor
23	High pressure transducer
24	Check valve (only for PX044–054)
25	NTC Temperature sensor for DIGITAL SCROLL compressor
26	Blind disk – only with optional 2–way CW valve

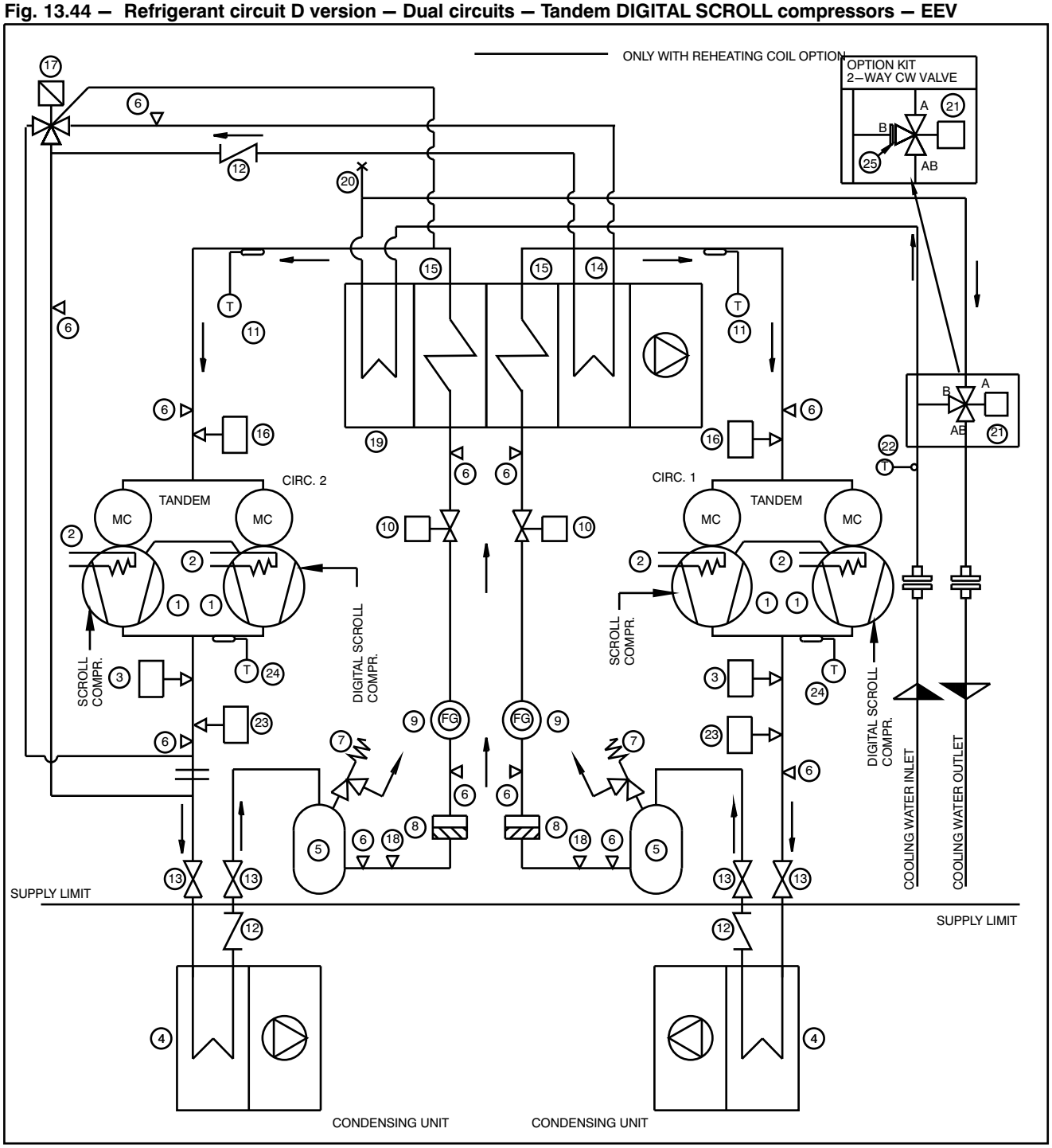
Fig. 13.43 – Refrigerant circuit D version – Dual circuits – Single SCROLL+DIGITAL SCROLL compressors – EEV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Air cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV
12	Check valve
13	Shut–off valve
14	Reheating coil (optional)

POS.	DESCRIPTION
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	High pressure transducer
19	Chilled water coil
20	Manual bleed valve
21	Chilled water 3–way valve
22	Inlet water sensor
23	Access valve 1/4
24	Check valve (only for PX044–054)
25	NTC Temperature sensor for DIGITAL SCROLL compressor
26	Blind disk – only with optional 2–way CW valve

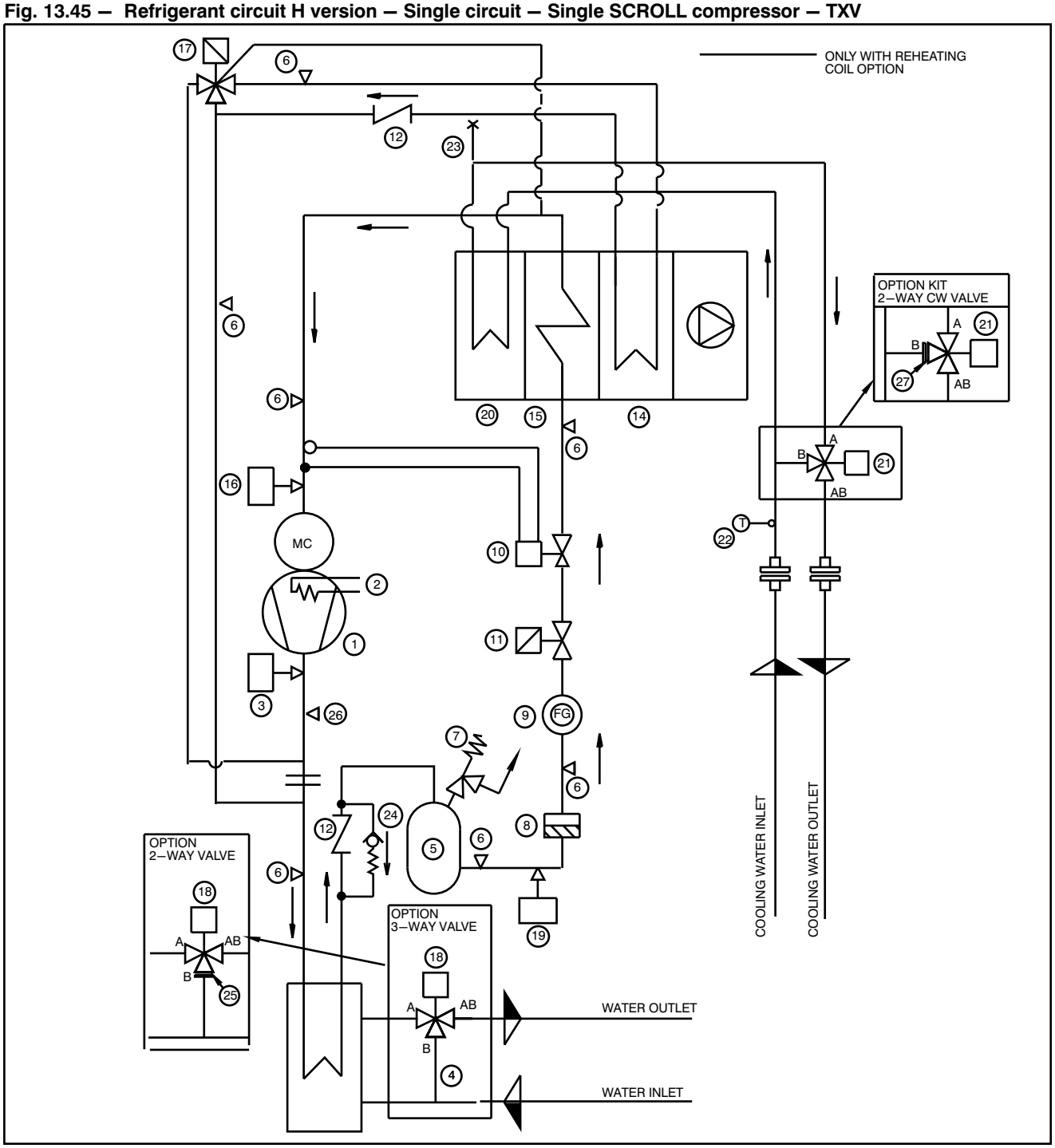
Fig. 13.44 — Refrigerant circuit D version — Dual circuits — Tandem DIGITAL SCROLL compressors — EEV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Air cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV
12	Check valve
13	Shut—off valve

POS.	DESCRIPTION
14	Reheating coil (optional)
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Access valve 1/4
19	Chilled water coil
20	Manual bleed valve
21	Chilled water 3—way valve
22	Inlet water sensor
23	High pressure transducer
24	NTC Temperature sensor for DIGITAL SCROLL compressor
25	Blind disk — only with optional 2—way CW valve

Fig. 13.45 — Refrigerant circuit H version — Single circuit — Single SCROLL compressor — TXV

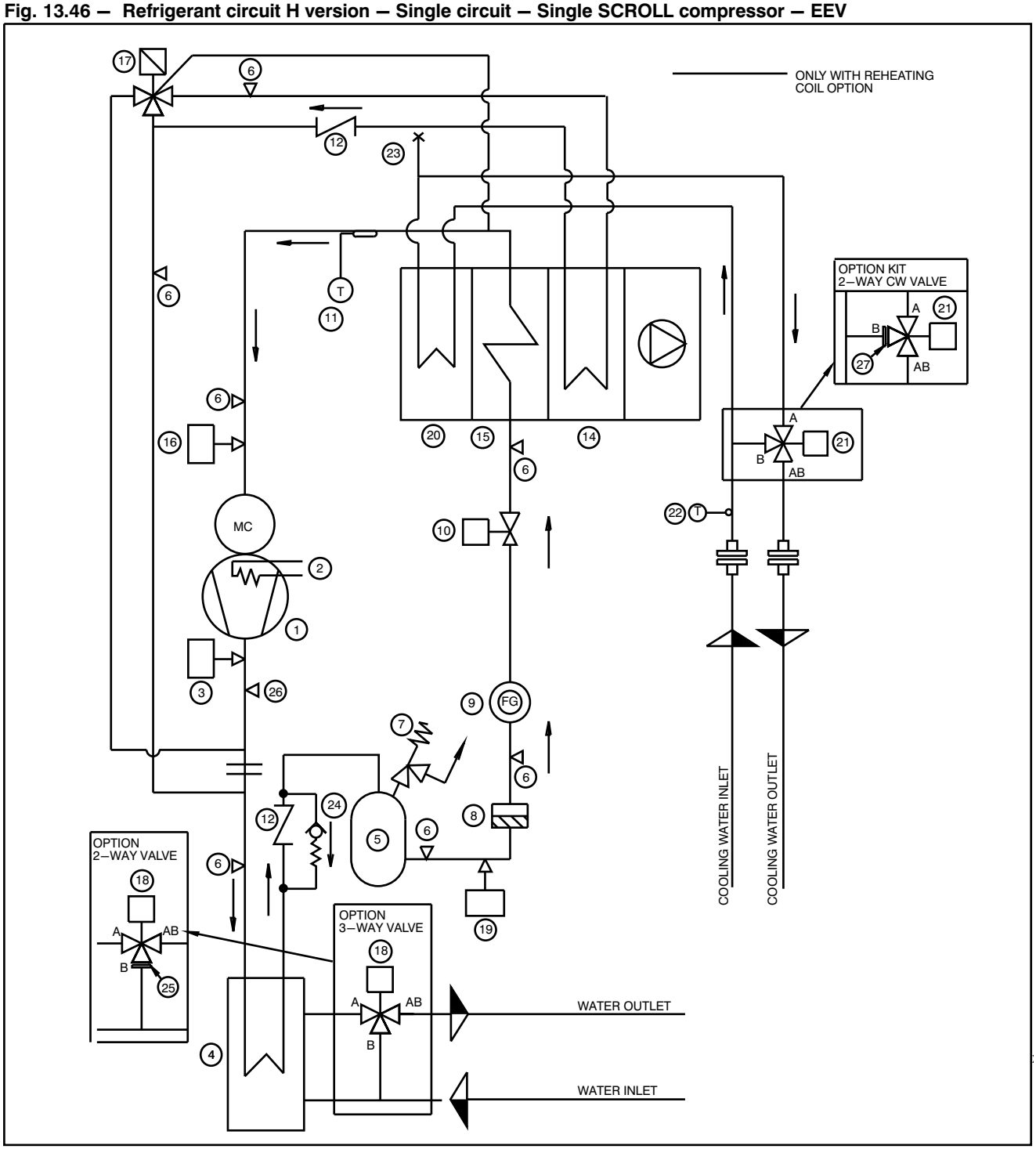


POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Thermostatic expansion valve
11	Shut–off solenoid valve
12	Check valve
14	Reheating coil (optional)

POS.	DESCRIPTION
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Chilled water coil
21	Chilled water 3–way valve
22	Inlet water sensor
23	Manual bleed valve
24	Check valve 10 bar (145 psi)
25	Blind disk — only with optional 2–way valve
26	Access valve 1/4
27	Blind disk — only with optional 2–way CW valve

Refrigerant and Hydraulic Circuits

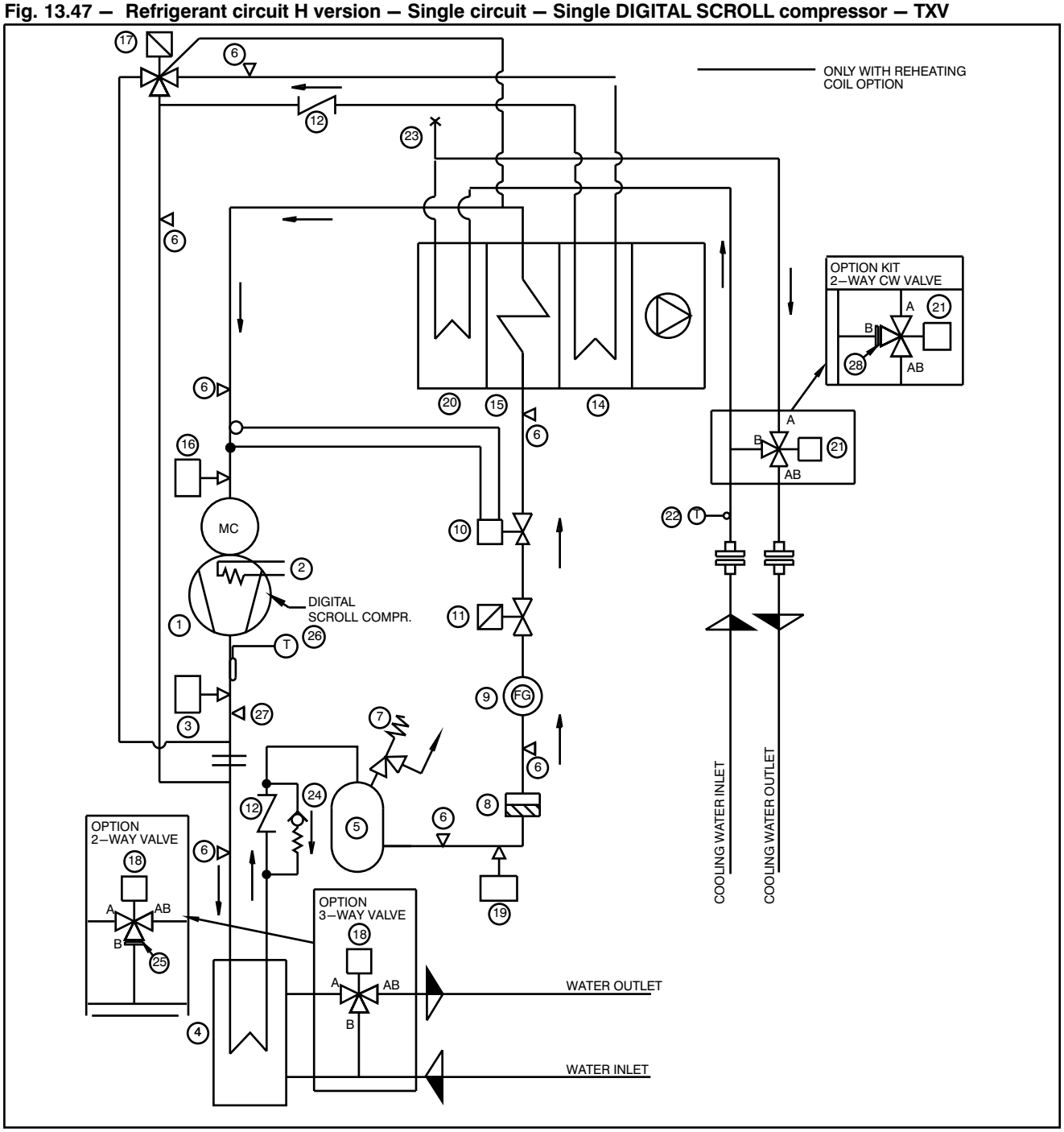
Fig. 13.46 — Refrigerant circuit H version — Single circuit — Single SCROLL compressor — EEV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV
12	Check valve
14	Reheating coil (optional)

POS.	DESCRIPTION
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Chilled water coil
21	Chilled water 3–way valve
22	Inlet water sensor
23	Manual bleed valve
24	Check valve 10 bar (145 psi)
25	Blind disk — only with optional 2–way valve
26	Access valve 1/4
27	Blind disk — only with optional 2–way CW valve

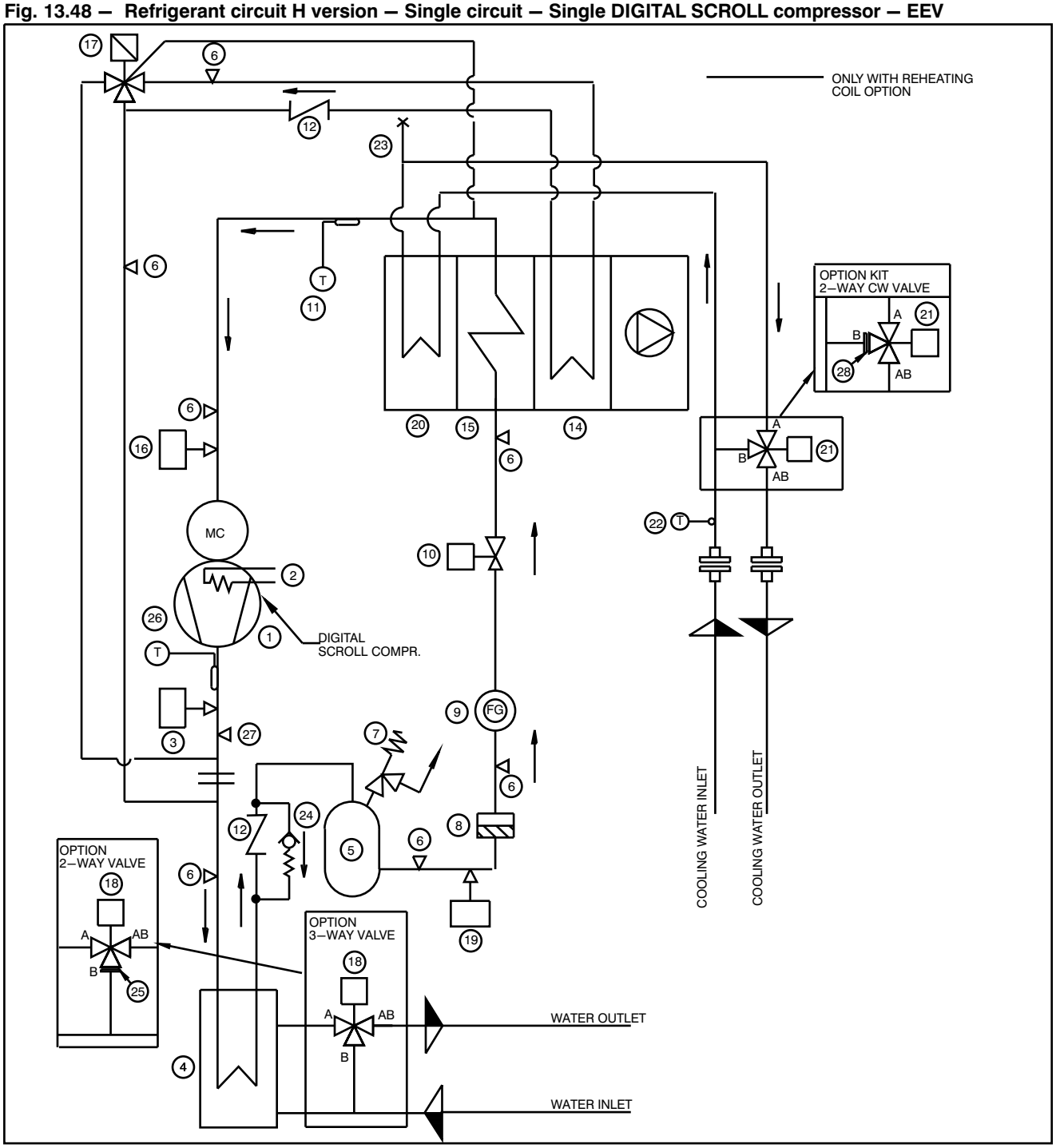
Fig. 13.47 — Refrigerant circuit H version — Single circuit — Single DIGITAL SCROLL compressor — TXV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Thermostatic expansion valve
11	Shut—off solenoid valve
12	Check valve
14	Reheating coil (optional)
15	Evaporator

POS.	DESCRIPTION
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Chilled water coil
21	Chilled water 3—way valve
22	Inlet water sensor
23	Manual bleed valve
24	Check valve 10 bar (145 psi)
25	Blind disk — only with optional 2—way valve
26	NTC Temperature sensor for DIGITAL SCROLL compressor
27	Access valve 1/4
28	Blind disk — only with optional 2—way CW valve

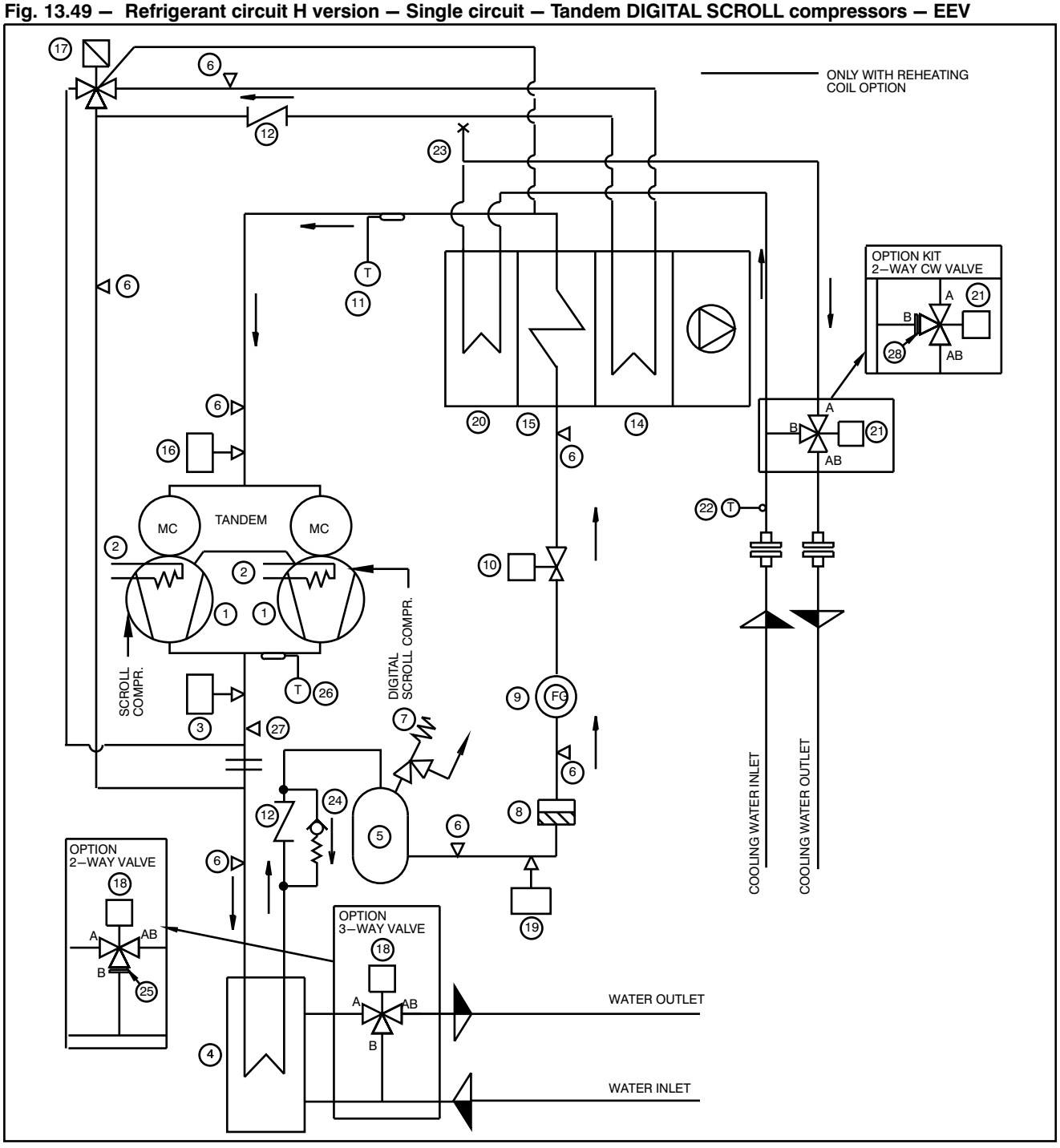
Fig. 13.48 — Refrigerant circuit H version — Single circuit — Single DIGITAL SCROLL compressor — EEV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV
12	Check valve
14	Reheating coil (optional)
15	Evaporator

POS.	DESCRIPTION
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Chilled water coil
21	Chilled water 3—way valve
22	Inlet water sensor
23	Manual bleed valve
24	Check valve 10 bar (145 psi)
25	Blind disk — only with optional 2—way valve
26	NTC Temperature sensor for DIGITAL SCROLL compressor
27	Access valve 1/4
28	Blind disk — only with optional 2—way CW valve

Fig. 13.49 — Refrigerant circuit H version — Single circuit — Tandem DIGITAL SCROLL compressors — EEV

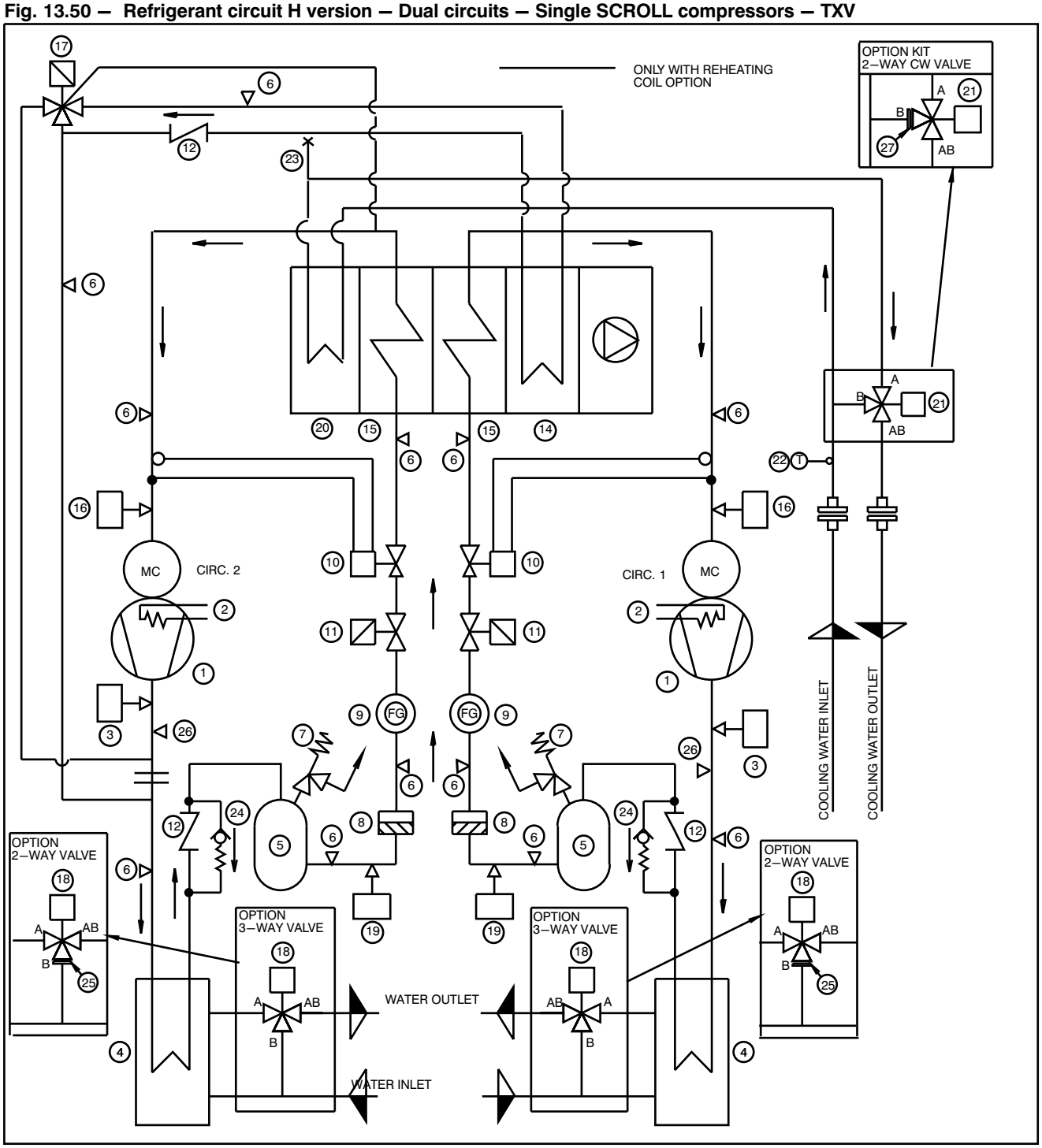


POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV
12	Check valve
14	Reheating coil (optional)
15	Evaporator

POS.	DESCRIPTION
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Chilled water coil
21	Chilled water 3—way valve
22	Inlet water sensor
23	Manual bleed valve
24	Check valve 10 bar (145 psi)
25	Blind disk — only with optional 2—way valve
26	NTC Temperature sensor for DIGITAL SCROLL compressor
27	Access valve 1/4
28	Blind disk — only with optional 2—way CW valve

Refrigerant and Hydraulic Circuits

Fig. 13.50 — Refrigerant circuit H version — Dual circuits — Single SCROLL compressors — TXV

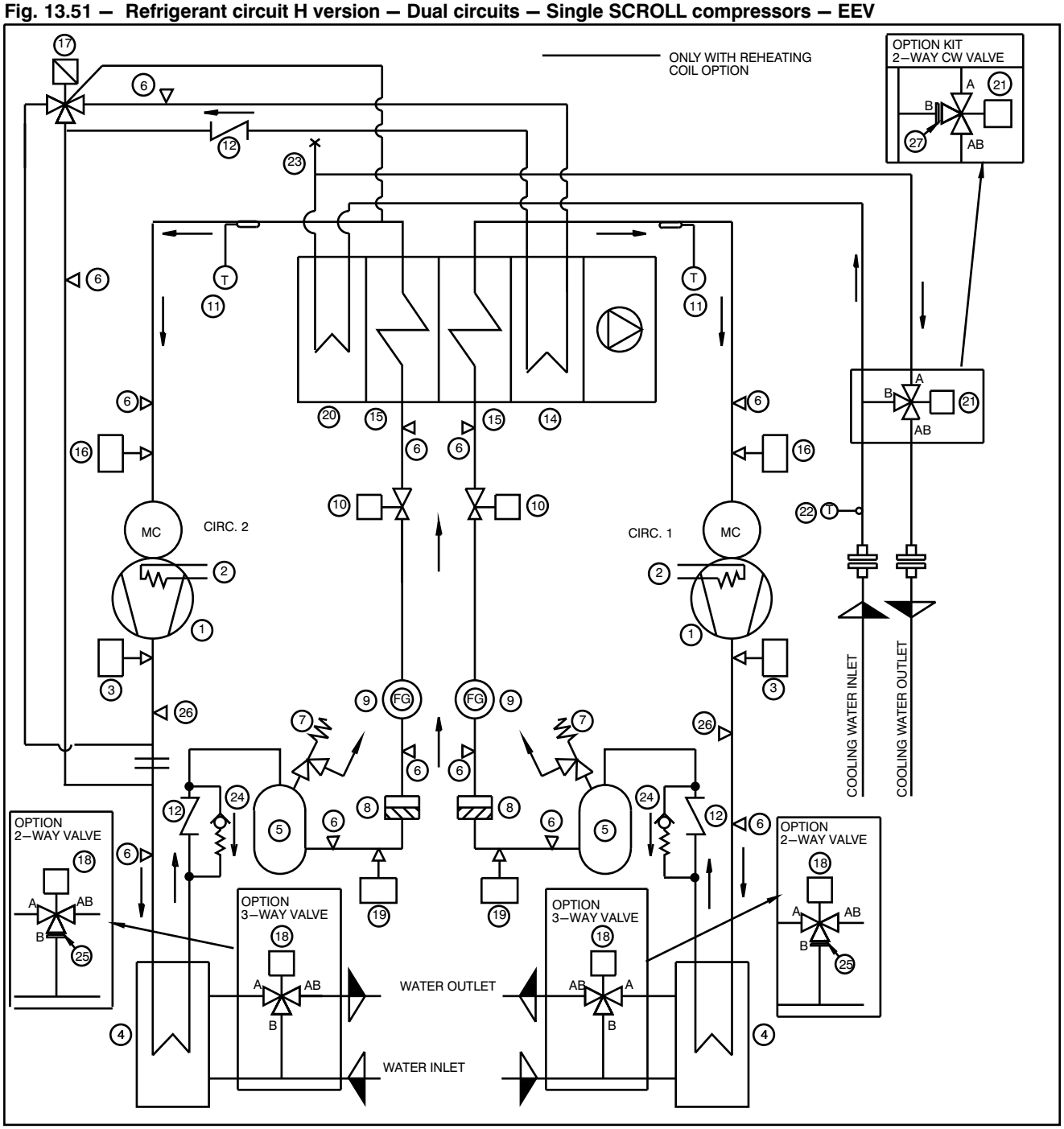


POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Thermostatic expansion valve
11	Shut–off solenoid valve
12	Check valve
14	Reheating coil (optional)

POS.	DESCRIPTION
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Chilled water coil
21	Chilled water 3–way valve
22	Inlet water sensor
23	Manual bleed valve
24	Check valve 10 bar (145 psi)
25	Blind disk – only with optional 2–way valve
26	Access valve 1/4
27	Blind disk – only with optional 2–way CW valve

Refrigerant and Hydraulic Circuits

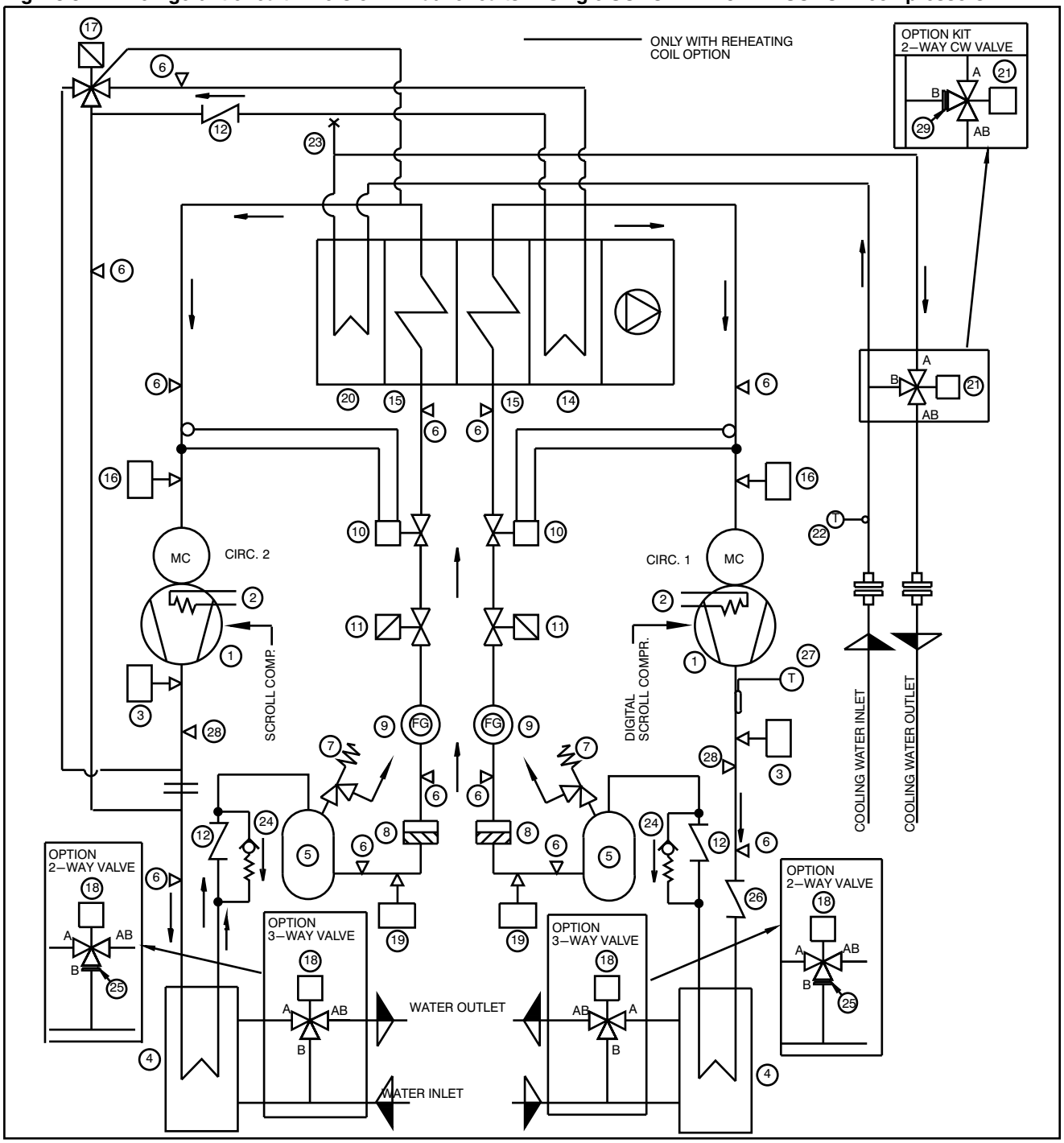
Fig. 13.51 — Refrigerant circuit H version — Dual circuits — Single SCROLL compressors — EEV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV
12	Check valve
14	Reheating coil (optional)

POS.	DESCRIPTION
15	Evaporator
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Chilled water coil
21	Chilled water 3–way valve
22	Inlet water sensor
23	Manual bleed valve
24	Check valve 10 bar (145 psi)
25	Blind disk – only with optional 2–way valve
26	Access valve 1/4
27	Blind disk – only with optional 2–way CW valve

Fig. 13.52 – Refrigerant circuit H version – Dual circuits – Single SCROLL+DIGITAL SCROLL compressors – TXV

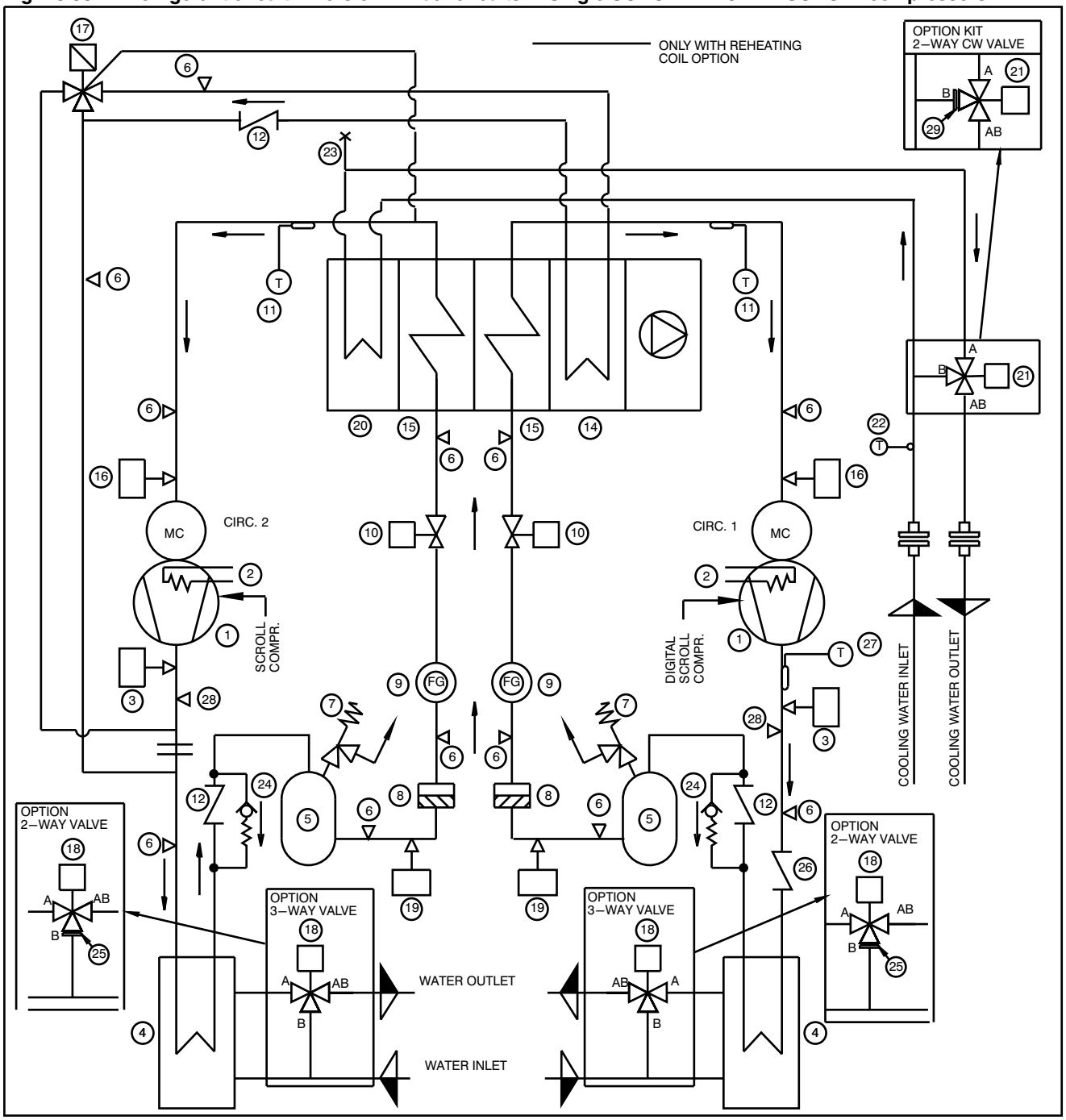


POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Thermostatic expansion valve
11	Shut–off solenoid valve
12	Check valve
14	Reheating coil (optional)
15	Evaporator

POS.	DESCRIPTION
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Chilled water coil
21	Chilled water 3–way valve
22	Inlet water sensor
23	Manual bleed valve
24	Check valve 10 bar (145 psi)
25	Blind disk – only with optional 2–way valve
26	Check valve for PX044–054
27	NTC Temp. sensor for DIGITAL SCROLL compr.
28	Access valve 1/4
29	Blind disk – only with optional 2–way CW valve

Refrigerant and Hydraulic Circuits

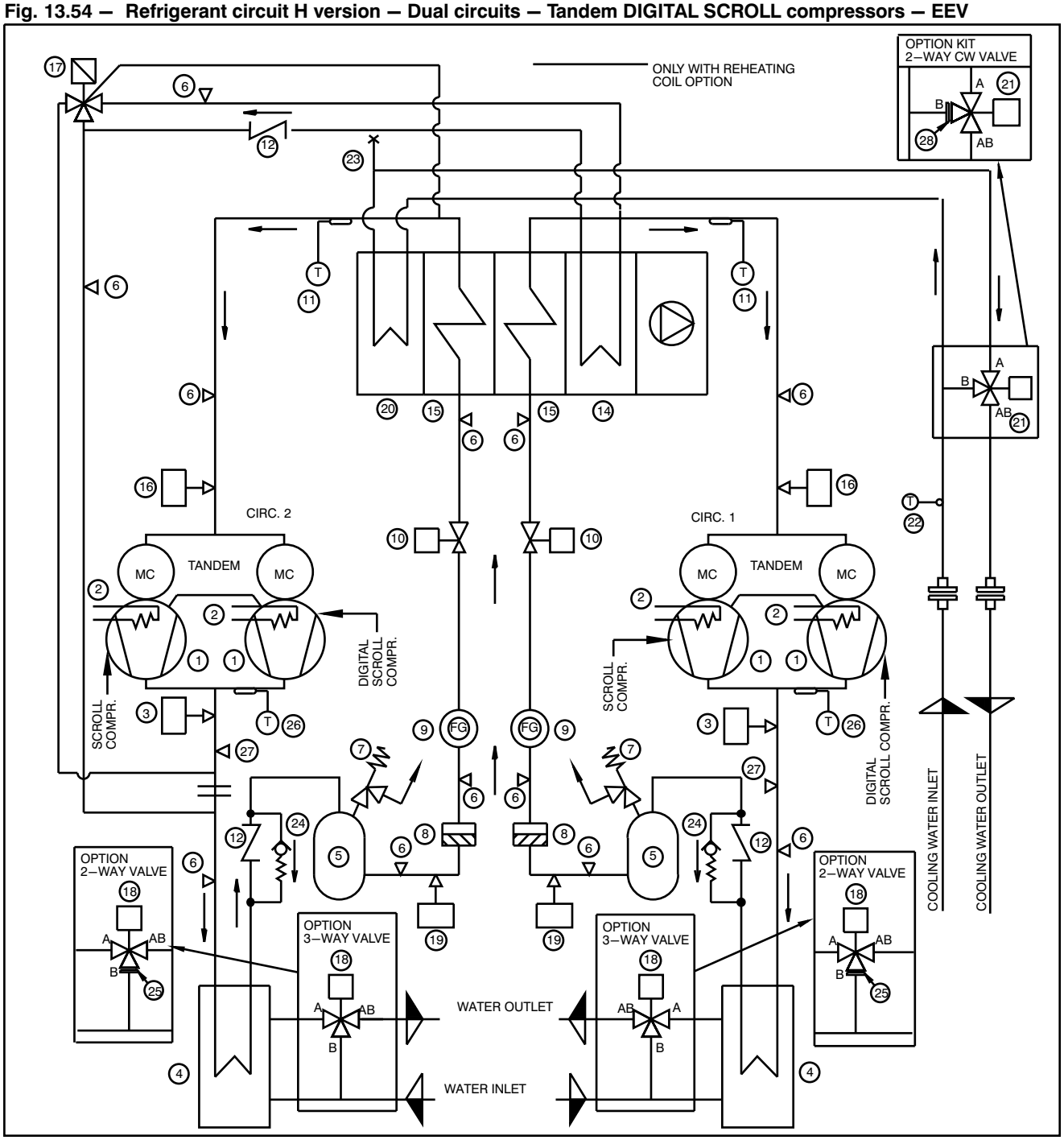
Fig. 13.53 – Refrigerant circuit H version – Dual circuits – Single SCROLL+DIGITAL SCROLL compressors – EEV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV
12	Check valve
14	Reheating coil (optional)
15	Evaporator

POS.	DESCRIPTION
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Chilled water coil
21	Chilled water 3–way valve
22	Inlet water sensor
23	Manual bleed valve
24	Check valve 10 bar (145 psi)
25	Blind disk – only with optional 2–way valve
6	Check valve for PX044–054
27	NTC Temp. sensor for DIGITAL SCROLL compr.
28	Access valve 1/4
29	Blind disk – only with optional 2–way CW valve

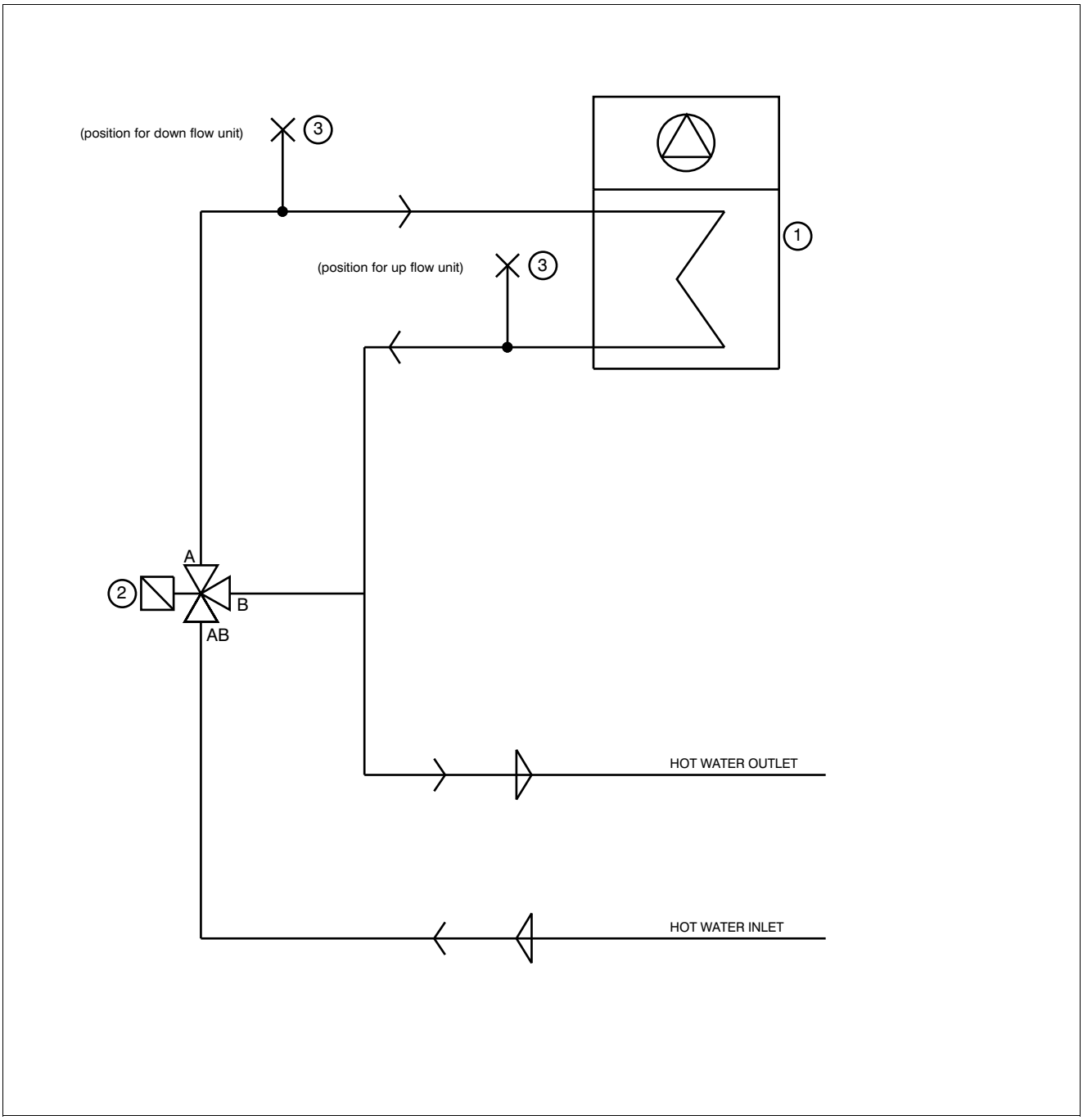
Fig. 13.54 — Refrigerant circuit H version — Dual circuits — Tandem DIGITAL SCROLL compressors — EEV



POS.	DESCRIPTION
1	Compressor
2	Crankcase heater
3	High pressure switch (HP)
4	Water cooled condenser
5	Liquid receiver
6	Access valve 5/16
7	Safety valve
8	Filter dryer
9	Sight glass
10	Electronic expansion valve (EEV)
11	Temperature sensor for EEV
12	Check valve
14	Reheating coil (optional)
15	Evaporator

POS.	DESCRIPTION
16	Low pressure transducer
17	Reheating solenoid valve (optional)
18	Condensing regulation water valve
19	Pressure transducer condensing regulation
20	Chilled water coil
21	Chilled water 3–way valve
22	Inlet water sensor
23	Manual bleed valve
24	Check valve 10 bar (145 psi)
25	Blind disk — only with optional 2–way valve
26	NTC Temperature sensor for DIGITAL SCROLL compressor
27	Access valve 1/4
28	Blind disk — only with optional 2–way CW valve

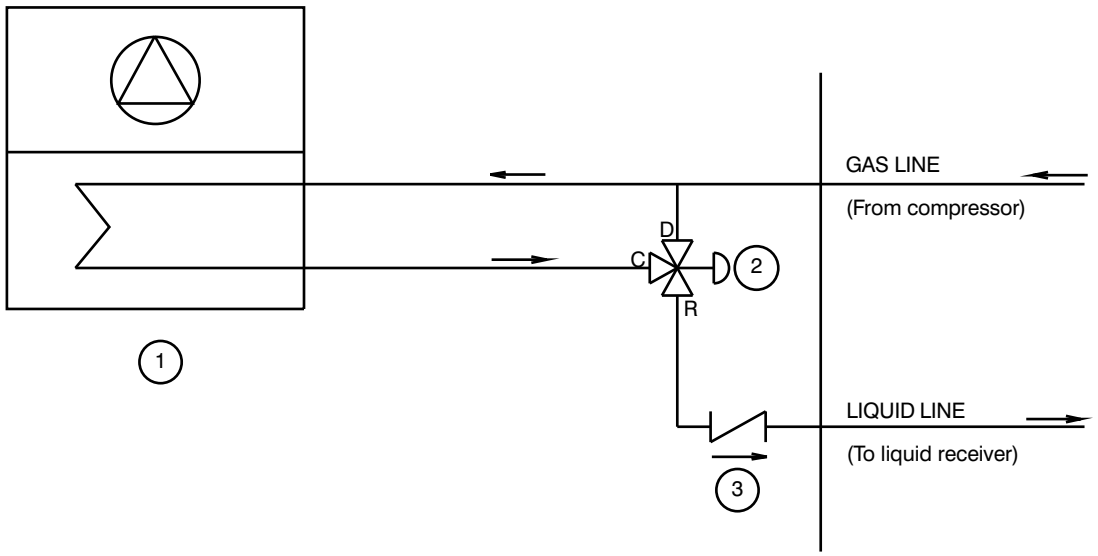
Fig. 13.55 — Hydraulic circuit hot water 3 way



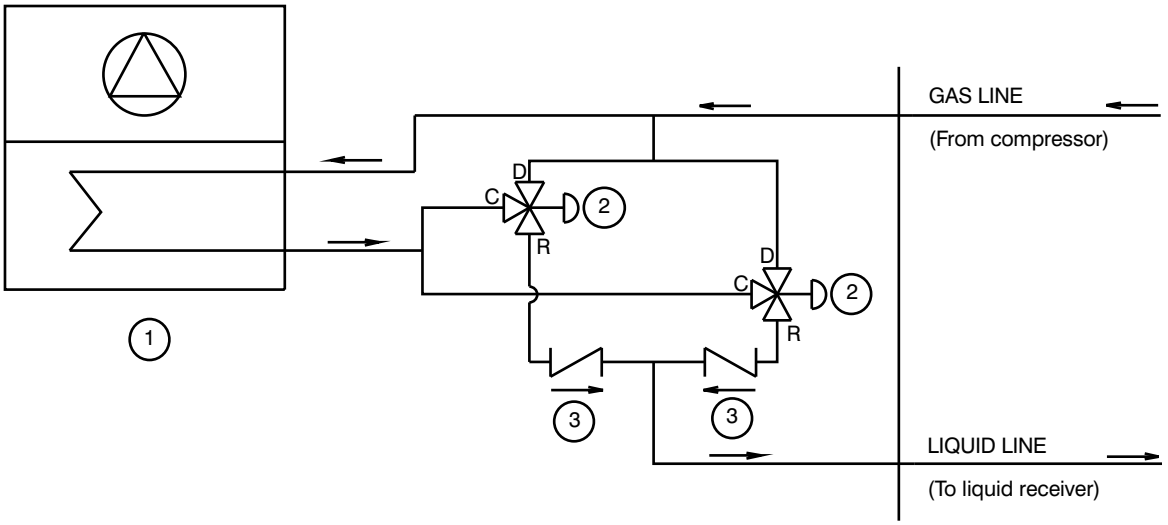
POS.	Components
1	Reheating coil
2	On/off 3–way valve
3	Manual bleed valve

Fig. 13.56 — Refrigerant circuit for head pressure control valve installation

PX041… PX104
(FOR EACH REFRIGERANT CIRCUIT)



PX120
(FOR EACH REFRIGERANT CIRCUIT)



POS.	Components
1	Air cooled condenser
2	Head pressure control valve
3	Check valve

14 Accessories

Silencing cartridges for supply hoods

See Chap. 7

High efficiency filters

See Chap. 9

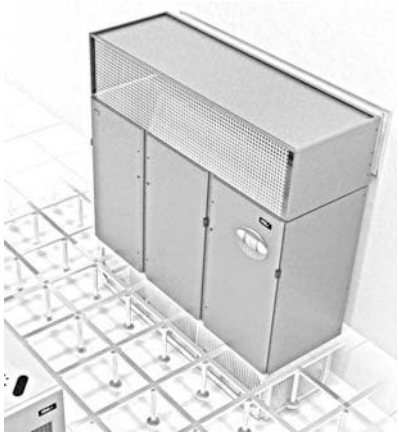
Filter holding duct

See Chap. 9

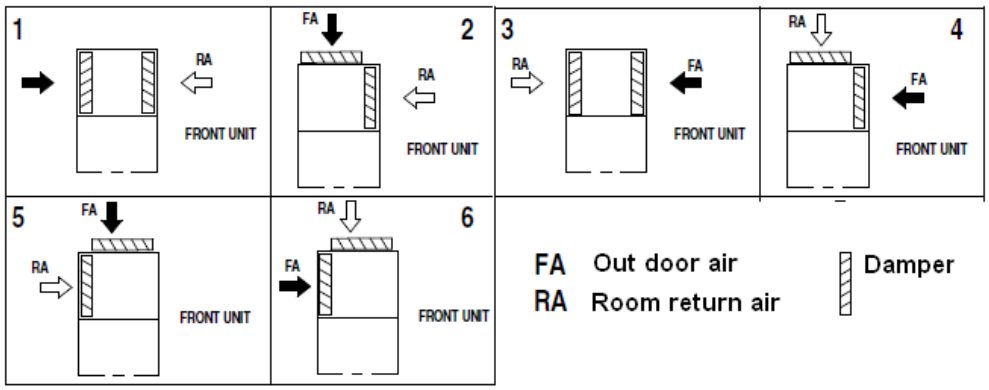
Fresh air kit

See Chap. 9

Air Economizer



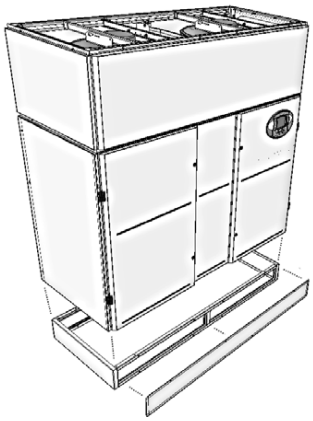
The Air Economizer comprises an extension hood 850mm height with a dampers system installable on top of the Downflow units. This system allows the free–cooling taking advantage of cool outdoor air to condition indoor space.
The iCOM checks the external air condition (temperature/humidity) and depending on environment conditions controls the dampers system mixing the indoor unit air with cool outdoor air; it is possible to have 100% outdoor air, mixed outdoor air and water cooling or 100% water cooling.
The Air Economizer system delivers high energy savings reducing or eliminating the cost of refrigerant pumping.
To use the Air Economizer the building has to be equipped with suitable air ducts and the dampers system modulating permits to use different channel configurations.
Note: it is required a flange 50 mm high to connect the air economizer to the unit (see Connecting Flange).
Air economizer available configuration:



Accessories

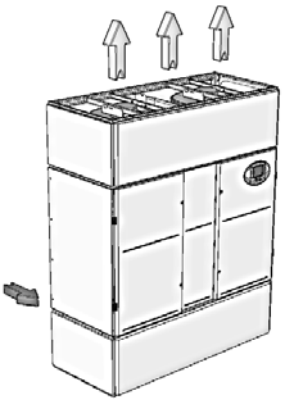
Horizontal hood with grill

A supply plenum with horizontal air flow can be installed on top of the unit. The 600 mm high plenum has the same design as the unit; it consists of sandwich panels lined with non−flammable insulation material of class 0 (ISO 1182.2), density 30 kg/m^3. It is equipped with a double deflection grill.



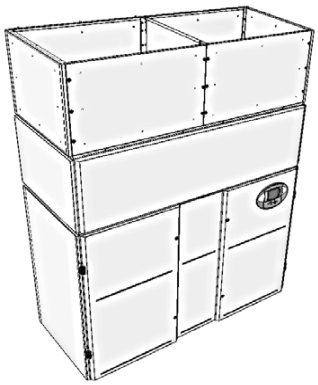
Base modules

A 200 mm high base module can be supplied on request to support Liebert® PDX Upflow and at the same time allow pipework to enter the base of the unit when a raised floor is not installed.



Base Module h 600/300 mm with rear air intake

A base module can be supplied on request to allow Liebert® PDX Upflow to work with a rear/bottom or bottom air intake. The rear/bottom air intake base module is 600 mm high, the bottom air intake base module is 300 mm high. This accessory at the same time supports the unit allowing the piping connection when a raised floor is not installed. Note that in this case the air conditioning unit must be ordered with a blind front panel and an open basement.



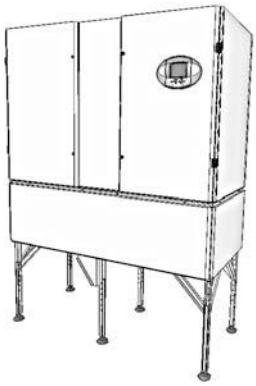
Vertical flow extension hood

An extension hood can be supplied on request and can be installed on top of the unit. It is available with different height: 500mm; 600mm; 700mm; 800mm; 900 mm. It has the same design as the unit and consists of sandwich panels lined with non−flammable insulation material of class 0 (ISO 1182.2), density 30 kg/m^3.
Note: on Downflow units it is required a flange 50 mm high to connect the extension hood to the unit (see Connecting Flange).

Accessories

Base frames

A base frame can be supplied on request to support Liebert® PDX when installed with a raised floor. The frame could be regulated with a height from 120mm to 800mm and the unit is fixed on it.



Kit Legs

Legs kit can be supplied on request to support Liebert® PDX when installed with a raised floor. The legs are fixed with the unit frame and allow to support the unit at different height, three kits are available with different height: adjustable in the range: h1— 30—370mm; h2 370—570mm; h3 570—800mm.

Flooding alarm (Liquistat)

The flooding alarm detects the presence of water or of any other conductive liquid and, opening a circuit, activates an alarm.
There are no moving parts and it is not subject to dirt or vibration. Up to 5 sensors can be connected to the same flooding alarm device to control many points in the room. The alarm device is supplied with a sensor. Additional sensors can be ordered separately.

Smoke alarm (Smokestat)

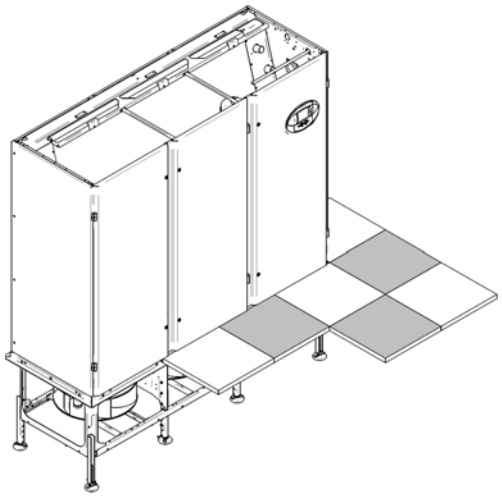
A smoke alarm can be installed to stop the conditioning system when the presence of smoke in the intake air is perceived. This is an optical smoke detector (it uses the Tyndall effect), which absorbs very low current (100mA) and is absolutely insensitive to light or wind.

Fire alarm (Firestat)

In some applications the fire regulations require the installation of an alarm device (Firestat) which deactivates the air conditioner when the intake air temperature is too high.

Floor tiles support kit

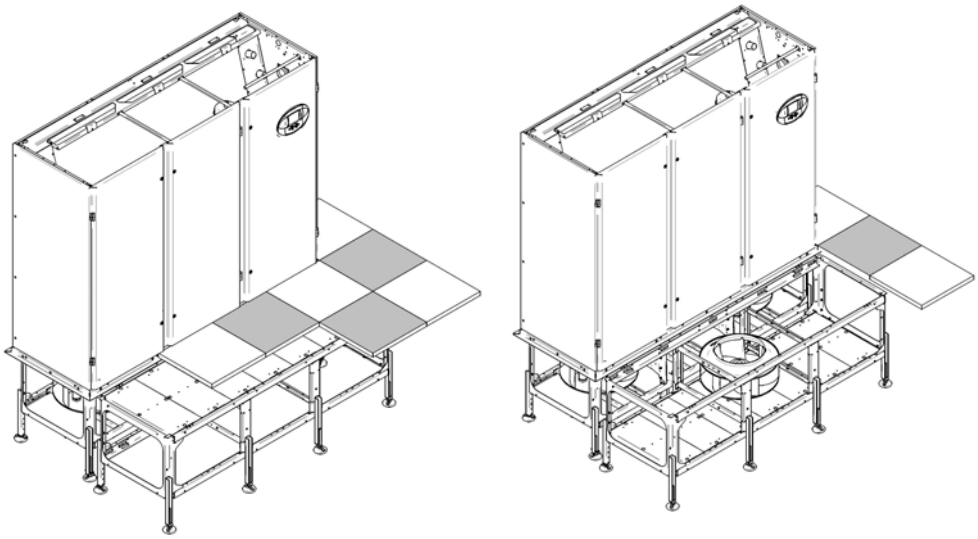
Floor tiles support kit can be supplied on request to support tiles around Liebert® PDX Downflow Down, when installed with a raised floor.
Floor tiles support is fixed on the unit frame/fan module and allows to support tiles until 40 mm thickness.
With a correct installation, the maximum admitted vertical distributed load on the perimeter is 180 kg/m.
I.e.: on the lateral side, 870 mm long, the maximum admitted distributed load is 157kg.
Floor tiles support is earthed with the unit frame.
Follow local rules for system grounding.



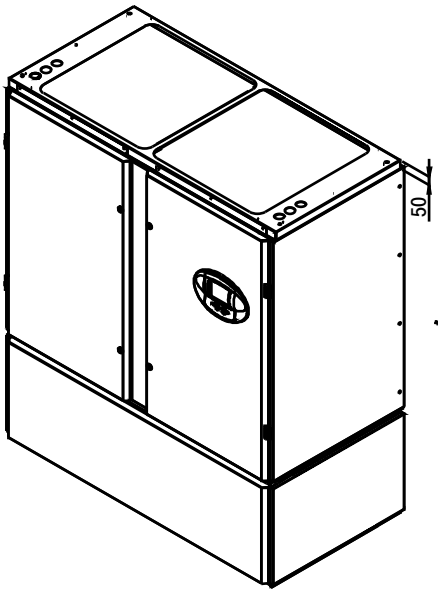
Accessories

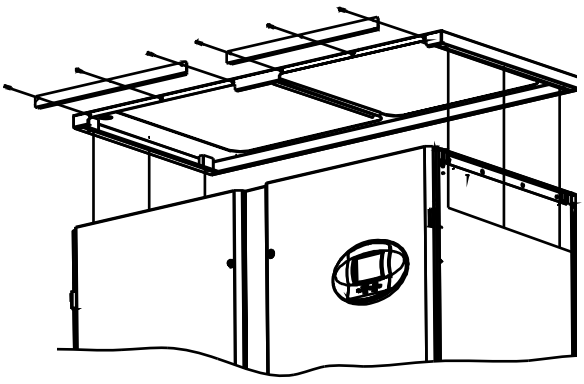
Fans maintenance kit

Fans maintenance kit can be supplied on request to support tiles on Liebert® PDX Downflow Down when installed with a raised floor.
Fans maintenance kit allows maintenance operations, in particular fans replacement, when the fans are installed below the floor level.
Removing tiles on the frontal area, it is possible to lift some footboards, moving them on the lower level, creating a service volume in the raised floor.
With a correct installation, the maximum admitted vertical distributed load is 600 kg/m^2.
Footboards are designed to support distributed load as indicated above, and the maximum concentrated load is 150 kg (on the area 50x50 mm).
Fans maintenance kit must be earthed following the local rules.



Connecting Flange





In Downflow Up, Downflow Frontal, Downflow Down units with predisposition for damper, economizer and plenum installation (digit 18=S, F, G, H or L) the unit is shipped with a connecting flange 50 mm high fixed on the unit top, so the unit is 50 mm higher. If required, the flange can be removed by unscrewing the fixing screws (removing the side panel to access the screws head) and repositioned later.

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