HEATING SYSTEM

RESIDENTIAL & LIGHT COMMERCIAL

HEAVY COMMERCIAL & INDUSTRIAL

# DOMINO EXR

***Air / water pumps with liquid injection scroll compressor for the production of hot water up to 65°C.***


EXR EXTENDED OPERATIVE RANGE

ErP COMPLIANT 2017

65°C

-20°C


**FROM 120 ZH TO 135 ZH**

**FROM 140 ZH TO 2145 ZH**

| Up to class A | Scroll compressor | Axial fans | Condensing coil fins | Outdoor installation | R410a refrigerant |
|---|---|---|---|---|---|

## TECHNICAL BULLETIN

**RANGE:**
**Cooling capacity: 20 – 143 kW**
**Heating capacity: 22 – 168 Kw**

COD. BT –DOMINO EXR E - MK – REV04 –0217 – UK

Thermocold THE AIRVOLUTION

## 1. PRODUCT IDENTIFICATION CODE

### DOMINO EXR

EXR EXTENDED OPERATIVE RANGE

The **DOMINO EXR** units are air-water reversible heat pumps at high temperature, provided with axial fans and liquid injection scroll compressors at high efficiency. Thanks to an extended operating range that allows the machine to reach very high water production temperatures even at very low outdoor air temperatures, these units are able to operate in extreme conditions of temperature.

### R410a REFRIGERANT

The R410a refrigerant is an ecological gas: it's not harmful to the ozone layer, it allows to obtain systems with high efficiency, it allows to contain the consumption of electrical energy and, therefore, the emission of $CO_2$ into the atmosphere.

R410a

### LIQUID INJECTION SCROLL COMPRESSOR

Liquid injection scroll compressors are optimized for R410a refrigerant and for heat pumps applications. They guarantee high reliability of the system, a lower number of components and reduced machine downtime thanks to liquid injection and to the sophisticated control system. The technology with liquid injection allows to raise the hot water production temperature with peaks up to 65°C to permit particular uses or antilegionella sanitization cycles; it also offers a wider opertating range:

- condensing temperature and low evaporating temperature;
- high outlet water temperature with low outdoor air temperature.

## HIGH EFFICIENCY HEAT EXCHANGER

The units are equipped with high efficiency evaporator stainless steeel AISI 316 brazed plate type externally insulated, complete of differential pressure switch and antifreeze protection electric heater.

HIGH ENERGY EFFICIENCY

## AXIAL FANS WITH LOW NOISE LEVEL

Axial fans with speed modulating regulation, in function of the condensing and evaporating pressure, with aerofoil blades extremely silent, suitable
for residential and commercial applications.

## HYDROPHILTECHNOLOGY

The coils can be treated with **HYDROPHIL** surface coating that allows to improve the heat exchange performance, allowing it to maintain high air flow and higher evaporation temperatures with high energy efficiency even with low air temperature.
It postpones the formation of frost thanks to a better drainage capacity of condensation. (OPTIONAL).

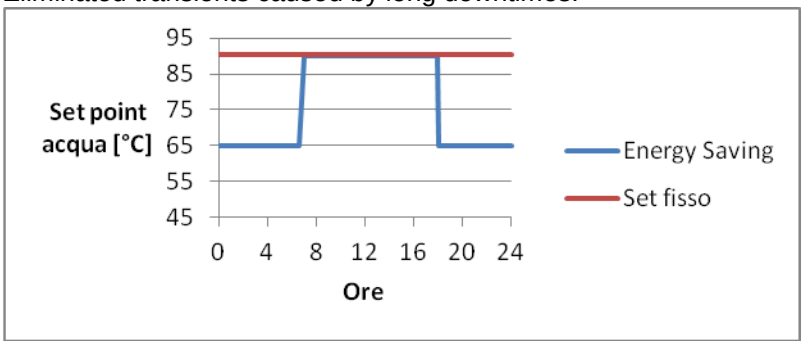
HYDROPHIL

## ENERGY SAVING & AUTO ON/OFF


By activating the ENERGY SAVING function and setting the daily time bands, the controller will adjust the set point value to the required value for that particular time of day.
Thanks to this function, the unit will be forced to work “more” at certain time when the cost of electricity is lower or even to work “less” when there is a lower heating load. By enabling the AUTO ON/OFF function and setting the daily time bands, it’s possible turn off the machine in desired hours. The electronic control gives priority to the automatic shutdown, if the two functions should be active for the same daily time band. Following are two examples to best explain the Energy saving function:

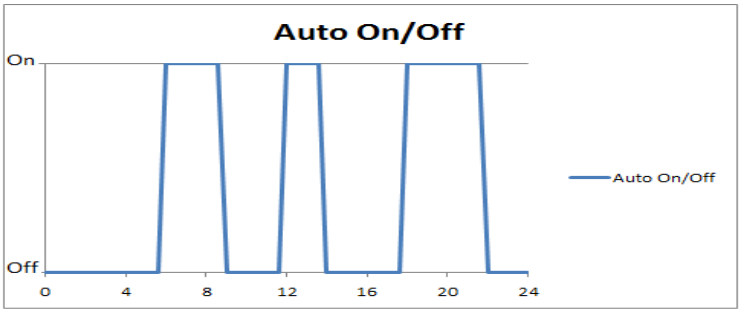
### 1) Energy Saving Example: industrial washing

Work shift: hours 7 -18;
Set point work shift: 90°C;
Set point out of the work shift: 65°C;
Eliminated transients caused by long downtimes.




### 2) Auto on/off example: residential installation

Request ACS: hour 6.00 – 9.00, 11.00 - 14.00, 18.00 – 22.00



## 2. PRODUCT IDENTIFICATION CODE

The encoding of **DOMINO EXR** is simple and follows the rules defined by Thermocold for all other units:

| DOMINO EXR | | | | | | |
|---|---|---|---|---|---|---|
| **2** | **110** | **Z** | **H** | **D** | **SL** | **B1** |

**Hydraulic version**

**B1:** Hydraulic kit including: N. 1 pump, low head pressure (150kPa)

**B2:** Hydraulic kit including: N. 2 pumps, low head pressure (150kPa)

**M1:** Hydraulic kit including: N. 1 pump, medium head pressure (250kPa)

**M2:** Hydraulic kit including: N. 2 pumps, medium head pressure (250kPa)

**A1:** Hydraulic kit including: N. 1 pump, high head pressure (450kPa)

**A2:** Hydraulic kit including: N. 2 pumps,high head pressure (450kPa)

**SB:** Hydraulic kit including: N. 1 pump,low head pressure (150kPa) with water tank

**SM:** Hydraulic kit including: N. 1 pump, medium head pressure (250kPa) with water tank

**SA:** Hydraulic kit including: N. 1 pump, high head pressure (450kPa) with water tank

**XB:** Hydraulic kit including: N. 2 pump,low head pressure (150kPa) with water tank

**XM:** Hydraulic kit including: N. 2 pump, medium head pressure (250kPa) with water tank

**XA:** Hydraulic kit including: N. 2 pump, high head pressure (450kPa) with water tank

**Acoustic version**
**SL**: Super low noise

**Energy versions**
**D:** Desuperheater (partial recovery)

**Basic version**

**H :** Air cooled packaged heat pump

**Compressor type**

**Z:** R410a and liquid injection scroll compressor

**Nominal cooling capacity (kW)**

**Number of circuits**

Example of identification code type: DOMINO EXR 2110 ZH SL B1

## 3. TECHNICAL SPECIFICATION

The **DOMINO EXR** units are air-water reversible heat pumps at high temperature, provided with axial fans , liquid injection scroll compressors at high efficiency, high efficiency evaporator brazed plate, available in 12 different sizes and in the following base version:
**H** Heat pump unit
The DOMINO EXR product family is available in a wide range of versions to suit many different plant applications.

### ENERGY VERSIONS
**D:** (partial recovery stainless steel brazed plate type desuperheater,externally insulated): the unit is equipped with an additional heat exchanger water - refrigerant fitted on the compressor discharge line, in series with the condensing coil. This solution allows to get a desuperheating heat recovery up to 25% of condensing heating, useful for sanitary or other applications.

### ACOUSTIC VERSIONS (ASSOCIATED TO BASE VERSION)
**SL:** Super low noise versions, including: condensing control with variable fan speed modulation, muffler on the compressors delivery lines and soundproof insulation for the compressors area.

### HYDRAULIC VERSIONS
**One pump and expansion vessel**
-B1 Hydraulic kit including: N. 1 pump, low available pressure (150 kPa), expansion vessel
-M1 Hydraulic kit including: N. 1 pump, medium available pressure (250kPa), expansion vessel (except sizes from 120 Z to 135 Z)
-A1 Hydraulic kit including: N. 1 pump, high available pressure (450kPa), expansion vessel (except sizes from 120 Z to 135 Z)

**Two pumps and expansion vessel**
-B2 Hydraulic kit including: N. 2 pumps, low available pressure (150kPa), expansion vessel (except sizes from 120 Z to 135 Z)
-M2 Hydraulic kit including: N. 2 pumps, medium available pressure (250kPa), expansion vessel (except sizes from 120 Z to 135 Z)
-A2 Hydraulic kit including: N. 2 pumps, high available pressure (450kPa), expansion vessel (except sizes from 120 Z to 135 Z)

**One pump, expansion vessel and water tank 80 l for sizes from 120 zh to 135 zh; 120 l for sizes from 140 zh to 175 zh; 300 l for sizes from 285 zh to 2145 zh**
-SB Hydraulic kit including: N. 1 pump, low available pressure (150kPa), expansion vessel, water tank (provided separately for sizes from 120 Z to 135 Z)
-SM Hydraulic kit including: N. 1 pump, medium available pressure (250kPa), expansion vessel, water tank (except sizes from 120 Z to 135 Z)
-SA Hydraulic kit including: N. 1 pump, high available pressure (450kPa), expansion vessel, water tank (except sizes from 120 Z to 135 Z)

**Two pumps, expansion vessel and water tank 80 l for sizes from 120 zh to 135 zh; 120 l for sizes from 140 zh to 175 zh; 300 l for sizes from 285 zh to 2145 zh**
-XB Hydraulic kit including: N. 2 pumps, low available pressure (150kPa), expansion vessel, water tank (except sizes from 120 Z to 135 Z)
-XM Hydraulic kit including: N. 2 pumps, medium available pressure (250kPa), expansion vessel, water tank (except sizes from 120 Z to 135 Z)
-XS Hydraulic kit including: N. 2 pumps, high available pressure (450kPa), expansion vessel, water tank (except sizes from 120 Z to 135 Z)
The water tank will be equipped with electric heaters as optional:

- 1x10kW from size 125 ZH to 140 ZH
- 2x10kW from size 150 ZH to 175 ZH
- 3x10kW from size 285 ZH to 2110 ZH
- 4x10kW from size 2130 ZH to 2145 ZH

These heaters have the function of integrating the thermal power when the outdoor air temperature is lowered up to a certain set value. In addition, at another outdoor temperature set the heating elements will completely replace the machine; This can only happen if the power is on.

**CASING**

From size 120 Z to 130 Z, the units are equipped with heavy gauge structure in galvanized steel. The powder paint anti-corrosive treatment over the entire frame provides long lasting resistance for outdoor installation, even in aggressive environmental conditions. The front panel is easily removable for access to all internal components and for allows maintenance operations with extreme ease.
Its design allows these machines to be manufactured in modular units and, at same time, it ensures a constant air flow through the finned coils and makes for easy maintenance and service.
From size 140 Z to 2145 Z, the units are equipped with heavy gauge structure in galvanized steel capable to withstand mechanical stresses both during transport and operation. The high corrosion resistance, ensured by the epoxy powder base treatment and by atmospheric agents allows the outdoor installation. The construction form guarantees a perfect passage of air through the finned changer and allows accessibility to internal components in order to facilitate repair and maintenance operations. In addition it is adaptable to all the various types of installation.
The total paneling of the units on the bottom side, available as optional accessory or integrated in the **Nordic kit**, permits the protection of the cooling circuit from weather elements such as snow, ice or rain by side panels present on carpentry.
The units are also equipped with condensate drain pans equipped with integrated oversized electrical heaters to avoid the formation of ice inside it facilitating the drainage of condensation water.

**LIQUID INJECTION SCROLL COMPRESSORS**

The compressors used in these units have been properly designed to obtain a compact and reliable system able to work in applications that require an high energy efficiency.
The unit is equipped with innovative liquid injection scroll compressor with optimized pressure ratio for heat pump operating mode, working with R410a refrigerant.
The mass flow rate is regulated by EIV valve according to discharge temperature and the compressor rating point. These compressors ensure:
- less applied parts for the system;
- no need to increase compressor motor size;
- lower risk of failures due to low discharge temperature;
- excellent mechanical strength at high compression ratios, maintaining a discharge temperature that does not affect the life cycle of the compressor;
- very high COP values, obtained thanks to fluidynamics optimization of internal passages, using high efficiency motors and introducing components of last generation;
- very low noise level;
- limited vibrations, thanks to accurated balancing of the masses;
- reduction of pulse pressure of refrigerant.

**CONDENSING COILS**

Finned condenser coils with aluminum fins and copper pipes mechanically expanded. They are of high efficiency type with subcooled liquid refrigerant circuit integrated that allows increased power without increasing power consumption.
The HYDROPHIL coating of the coil fins is an optional coil tratment available on the price list.
The coil fins, due to water-repellent HYDROPHIL treatment, facilitate the condensate drainage by minimizing the risk of icing of the coils. Consequently the number of defrosts needed will be minimized.
If the unit is equipped with the optional NORDIC KIT, electrical heaters are mounted on the coils, immersed in the last rows, in such a way that heat is developed around the entire pipe by increasing the conduction of heat. These electrical heaters are useful to prevent ice formation on the coils and reduce the defrosting time favoring the drainage of condensation.

**FANS**

From size 120 Z to 130 Z, the units are equipped with propeller type fans, with blades statically and dynamically balanced Three-phase fan motors, closed type with external rotor and thermal overload protection and suitable for outdoor installation with protection degree IP 54. Windings in F class of protection, internal protection according to VDE, suitable for a temperature range from -40 to + 60 ° C.
All models are equipped with electronic device for the control of fans speed, which has the dual advantage of allowing their operation in cooling cycle, with low outdoor temperatures and greatly reducing the noise level.
From size 140 Z to 2145 Z, the units are equipped with ECO-PROFILE propeller type fans, with blades statically and dynamically balanced, three-phase fan motors, closed type with external rotor and thermal overload protection and suitable for outdoor installation. Windings in F class of protection, internal protection according to VDE 0730, suitable for a temperature range from -40 to + 60 ° C.
The ECO-PROFILE fans ensure a higher efficiency thanks to lower energy consumption
compared to traditional AC motors. The lower energy consumption is guaranteed by a low rpm and "owlet" blade profile to reduce the effect of the vortices, in order to reduce the energy consumption for operating and the value of acoustic emissions, reducing average of 6 dB (A) compared to common fans. The fans can be equipped with continuous speed adjustment OPTIONAL (RGF) and therefore continuous control of evaporation and condensation.
DOMINO EXR units can be equipped with an optional accessory: the new generation EC-BRUSHLESS ECOPROFILE fans. It ensure a higher efficiency thanks to lower energy consumption compared to traditional AC motors.
The EC motors allow therefore lower sound emissions during the air flow modulation. The blade profile has been studied to reduce noise and ensure high acoustic comfort levels.

**EVAPORATOR**

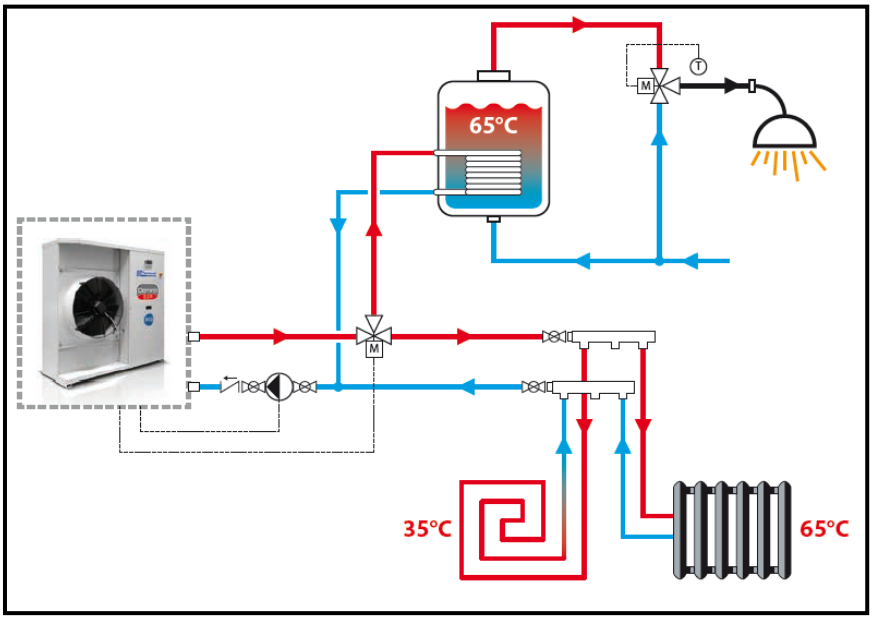
Direct expansion, stainless steel AISI 316 brazed plate type, externally insulated with closed cell anticondensation material and equipped with water differential pressure switch and antifreeze protection electric heater managed by the electronic controller of the unit.
The high efficiency evaporator is caracterized characterized by small dimensions and a special configuration of the plates that allow the achievement of high performance at high water temperatures.

**REFRIGERANT CIRCUIT**

The units are equipped with a refrigerant circuit, entirely constructed with copper tubes, including:
• Electronic expansion valve;
• Filter drier;
• Indicator lamp for liquid flow;
• Solenoid valve on the liquid line;
• High pressure switch;
• Low pressure switch;
• Safety valve on the high and low pressure line;
• 4 way reverse valve, liquid receiver and liquid accumulator on the sunction line;
• Liquid injection compressor line.

**3-WAY VALVE FOR SANITARY WATER PRODUCTION (OPTIONAL PROVIDED LOSE)**

The production of hot sanitary water is possible thanks to a 3-way motor driven valve: it is an ON/OFF type and must be installed by the customer on the air conditioning side.
The unit is able to handle the valve according to the request of heating system with priority on the DHW production: when the water tank temperature reaches the set point chosen, the hot water is diverted by the 3-way valve from the hot sanitary water tank to the space heating system. Furthermore it is possible to set two different set points, one for the space heating and another one for the hot sanitary water.



**POWER AND CONTROL ELECTRICAL PANEL**

The electrical panel made in accordance with CEI-EN 60204-1 (CEI44-5; CEI EN 62061) standards, with short-circuit current of 10kA and installed inside the unit includes:

- Safety locked main switch;
- Protection fuses for the supply line of each compressor;
- Protection fuses for the supply line of fans for each refrigerant circuit;
- Protection fuses of auxiliary circuit;
- Start up contactors for compressors dimensioned according to the maximum stress;
- Start up contactors for fans;
- Adjustable thermal magnetic circuit breaker for the protection of the pump (only in case of units equipped with hydraulic kit);
- Start up contactors for pump (only in case of units equipped with hydraulic kit);
- single-phase transformer for the power supply of the auxiliary circuits;
- numbered wires;
- microprocessor control.


The wiring of the electric panel and the connection with the components of the units are made using cables appropriately calculated for operation at 55°C and according to the maximum electrical stress of the components. All the cables and the terminals are univocally numbered according to the electrical scheme in order to avoid possible misinterpretation. The identification system of the cables connected to the components allow also an easy and intuitive recognition of the component.
Each component of the electrical panel is provided with an identification plate according to what is shown on the electrical scheme. All the connection to the electrical panel are made from the bottom and are equipped with cover preventing from break.
The electrical panel supply is 400V/3ph+n/50Hz and no additional power supply is necessary. The input of the power cables is provided on the bottom of the box where it is provided a dismountable flange suitable for the purpose.

The programmable controller is based on a powerful platform with 256bit microprocessor, 4MB mass storage with a hardware and software configuration made with the most innovative technology in terms of processing speed and connectivity.
The diagnostics includes a complete alarm management, alarm history and data logger which stores an archive of about 4 days (further expandable by USB memory) where the main variables and the operating status of the unit are recorded. ModBus master and slave communication protocol. The temperature regulation us carried out by two hydraulic circuits (cooled water and hot water), with a continuous proportional logic according to the return water temperature.
The operating parameters of the machine are protected by 3 levels of password (user-maintainer-builder). The user panel provides information on LED display (sizes from 120 up to 135) with exhaustive descriptions in Italian, English, Spanish and French (selectable) and on LCD display (sizes from 140 up to 2145).

- Ability to interface with the main BMS systems via RS485;
- Ability to interface with I/O expansion modules via CanBus;
- Ability to control the unit by voltage free contacts;
- Input USB/Ethernet adaptor for routing on the web of all the parameters of the unit, providing a total remote control of unit;

- USB input to upload parameter files, system files, firmware and to download files of historical alarms, residing parameters files and default parameters files.t;
- User interface on the door of the panel, low-reflection LCD, equipped with 8 function keys, easy iconic display, easy sliding between the dynamic screens;
- Control of condensation / evaporation air directly managed by the electronic controller based on proportional logic (optional, standard on SL version);
- Management of electronic expansion valves through controller based on PID logic, with LOP control (low operating pressure), maintenance of the minimum working pressure and of the MOP (maximum operating pressure) for the management of the maximum working pressure;

The microprocessor manages:

- Starting of the compressors with the start-up and stop time control;
- Compressor rotation with FIFO logic;
- Fans start up and modulation according with condensation and evaporation pressure;
- Electric anti-freeze heater for user exchangers;
- Electric heater mounted on the base of coils to avoid ice formation;
- Hot and cold side water pumps management through voltage free contacts for standard versions; for hydraulic versions the pump management is automatically controlled;
- Alarm signal for each refrigerant circuit of the unit through voltage free contacts.

The microprocessor will control and display by suitable measuring transducers the following variables:

- Inlet and outlet water temperature to the user exchanger;
- Outdoor temperature;
- Condensing pressure of each refrigerant circuit;
- Evaporating pressure of each refrigerant circuit;
- Total operating time of each compressor;
- Total operating time of the unit.

The microprocessor will protect the unit in the following cases, the resetting of any alarm will always be manual.

- Low evaporating pressure by analogical and digital input with possibility to edit the marking details;
- High condensing pressure by analogical and digital input;
- High temperature of the compressors windings;
- Reverse rotation of each compressor;
- High temperature of fans motor windings;
- High temperature of pumps motor windings;
- Lack of water flow on evaporator and condenser;
- Low outlet water temperature from the source heat exchanger.

It is also possible to display and edit through the microprocessor the following value:

- Operating set point of the unit;
- Operating differential of the unit;
- Set point and anti-freeze block differential;
- Set point and differential of activation of the evaporator heater;
- Minimum operating time of each compressor;
- Minimum stop time of each compressor;
- Maximum number of starts per hour of each compressor;
- Set point and optimal condensation pressure differential (condensation and evaporation control).

Other functionalities ensured from the microprocessor are:

- Activating of preventive functions at extreme conditions of high pressure;
- Activating of preventive functions at extreme conditions of low pressure;
- Activation of preventive functions at limit conditions of high discharge temperature;
- Activating preventive functions at extreme conditions of low evaporator leaving water temperature;
- Activating preventive functions at extreme conditions of high evaporator inlet water temperature;
- Protection from unwanted changes of the parameters thanks of the use of password and systems to confirm the changed data;
- Indication of the unit status and the components status;
- Possibility to exclude each compressor for the maintenance;
- Possibility to change the set point by external analog signal;
- Possibility of ON/OFF remote signal through digital external signal;
- Communication with supervision systems (data and parameters exchange);
- Continuous adjustment of the set point according to the outdoor air temperature both with direct and reverse direction logic (DSP);
- Intelligent management of defrosts depending on the approach of the coil (Digital Defrost);
- Auto power on-off of the unit using time slots;
- Adjustment of the set point by time bands both with direct and reverse direction logic (Energy Saving).

The electronic controller can be interfaced with a supervision software on a local or remote PC that uses a manufacturer communication protocol, or with complex BMS systems using ModBus protocol.

## DOMINO EXR SL

| MODEL | | 170 ZH | 175 ZH | 285 ZH | 295 ZH | 2110 ZH | 2130 ZH | 2140 ZH | 2145 ZH |
|---|---|---|---|---|---|---|---|---|---|
| **COOLING MODE** | | | | | | | | | |
| Total cooling capacity | kW | 65,9 | 72,1 | 82,4 | 91,8 | 107,1 | 127,3 | 133,8 | 140,4 |
| Compressors power input | kW | 21,7 | 25,1 | 30,2 | 35,7 | 38,7 | 43,0 | 46,3 | 49,8 |
| EER Total | | 2,76 | 2,65 | 2,47 | 2,36 | 2,56 | 2,70 | 2,65 | 2,60 |
| ESEER | | 2,93 | 2,94 | 2,41 | 1,90 | 2,24 | 2,50 | 2,50 | 2,57 |
| IPLV | | 3,20 | 3,21 | 2,60 | 2,07 | 2,43 | 2,68 | 2,74 | 2,77 |
| **HEATING MODE** | | | | | | | | | |
| Total heating capacity | kW | 74,0 | 81,6 | 97,0 | 108,7 | 125,6 | 146,6 | 154,9 | 162,6 |
| Compressors power input | kW | 20,2 | 22,8 | 27,7 | 32,0 | 35,7 | 41,2 | 43,5 | 46,4 |
| COP Total | | 3,32 | 3,27 | 3,14 | 3,09 | 3,23 | 3,23 | 3,25 | 3,21 |
| **COOLING + PARTIAL RECOVERY (D VERSION)** | | | | | | | | | |
| Desuperheater heating capacity | kW | 21,5 | 21,6 | 21,6 | 21,8 | 21,6 | 21,5 | 21,5 | 21,6 |
| Water flow | m³/h | 3,7 | 3,8 | 3,8 | 3,8 | 3,8 | 3,7 | 3,7 | 3,8 |
| Pressure drop | kPa | 29 | 23 | 17 | 14 | 11 | 8 | 7 | 7 |
| **COMPRESSORS** | | | | | | | | | |
| Number | n | 2 | 2 | 3 | 4 | 4 | 4 | 4 | 4 |
| Refrigerant circuits | n | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 |
| Capacity steps | n | 3 | 3 | 5 | 7 | 11 | 8 | 4 | 8 |
| Refrigerant charge | kg | 19,8 | 19,8 | 20,4 | 20,4 | 30,4 | 39,5 | 39,8 | 39,8 |
| Oil charge | kg | 6,6 | 6,9 | 10,2 | 13,2 | 13,2 | 13,2 | 13,2 | 13,8 |
| **WATER HEAT EXCHANGER** | | | | | | | | | |
| Water flow | m³/h | 11,3 | 12,4 | 14,1 | 15,8 | 18,4 | 21,8 | 23,0 | 24,1 |
| Water pressure drops | kPa | 15 | 16 | 9 | 9 | 9 | 9 | 10 | 10 |
| Water flow (PDC) | m³/h | 12,9 | 14,2 | 16,9 | 18,9 | 21,9 | 25,5 | 27,0 | 28,3 |
| Water pressure drops (PDC) | kPa | 17 | 18 | 10 | 11 | 11 | 11 | 12 | 12 |
| **FANS** | | | | | | | | | |
| Number | n | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 4 |
| Air flow | m³/h | 44320 | 44320 | 69000 | 69000 | 66480 | 88640 | 88640 | 88640 |
| Power input for each fan | kW | 1,05 | 1,05 | 1,05 | 1,05 | 1,05 | 1,05 | 1,05 | 1,05 |
| Absorbed current for each fan | A | 2,10 | 2,10 | 2,10 | 2,10 | 2,10 | 2,10 | 2,10 | 2,10 |
| **ACOUSTIC DATA** | | | | | | | | | |
| Sound pressure level (ISO 3744) | db | 79,3 | 79,5 | 80,3 | 83,9 | 81,2 | 82,3 | 82,8 | 82,5 |
| Sound pressure level at 5 m (ISO 3744) | db | 52,6 | 52,7 | 53,3 | 56,9 | 54,2 | 55,3 | 55,7 | 55,4 |
| Sound pressure level at 10 m (ISO 3744) | db | 47,5 | 47,6 | 48,3 | 51,9 | 49,2 | 50,3 | 50,8 | 50,5 |
| **DIMENSIONS AND WEIGHT** | | | | | | | | | |
| Length | mm | 2558 | 2558 | 3599 | 3599 | 3599 | 2558 | 2558 | 2558 |
| Depth | mm | 1100 | 1100 | 1100 | 1100 | 1100 | 2200 | 2200 | 2200 |
| Height | mm | 2090 | 2090 | 2205 | 2205 | 2205 | 2205 | 2205 | 2205 |
| Weight | kg | 841 | 845 | 1140 | 1210 | 1304 | 1368 | 1374 | 1379 |

***Cooling mode**:*
*Outdoor air temperature 35°C; Outlet water temperature 12/7°C.*
***Heating mode**:*
*Outdoor air temperature 7°C - 90% R.H.;Outlet water temperature 40/45°C.*
***POWER CONSUMPTION:** below 2 ° C of outdoor temperature the total power and current input of the unit increase of 3% compared to what is shown in tab. During defrosts the total power and current absorbed by the machine can increase up to a maximum of 20% of the declared value.*

**DOMINO EXR SL**
**COOLING PERFORMANCE**

| Twout | | | 2140 | | | | | | 2145 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Outdoor air temperature | | | | | | Outdoor air temperature | | | | | |
| | | | **25** | **30** | **32** | **35** | **40** | **43** | **25** | **30** | **32** | **35** | **40** | **43** |
| 5 | Pf | kW | 141,6 | 134,5 | 131,5 | 127,0 | 121,1 | 117,8 | 148,7 | 141,2 | 138,1 | 133,2 | 127,0 | 123,5 |
| | Pa | kW | 38,3 | 41,5 | 43,0 | 45,4 | 48,7 | 50,7 | 41,1 | 44,6 | 46,2 | 48,8 | 52,3 | 54,5 |
| | qw | m³/h | 24,26 | 23,05 | 22,54 | 21,76 | 20,76 | 20,18 | 25,49 | 24,20 | 23,66 | 22,83 | 21,77 | 21,17 |
| | dpw | kPa | 11,2 | 10,1 | 9,7 | 9,0 | 8,2 | 7,7 | 11,4 | 10,3 | 9,8 | 9,2 | 8,3 | 7,9 |
| **6** | Pf | kW | 145,5 | 138,1 | 135,1 | 130,4 | 124,3 | 120,9 | 152,8 | 145,0 | 141,8 | 136,8 | 130,4 | 126,8 |
| | Pa | kW | 38,8 | 42,0 | 43,5 | 45,8 | 49,2 | 51,2 | 41,6 | 45,1 | 46,7 | 49,3 | 52,8 | 55,1 |
| | qw | m³/h | 24,95 | 23,69 | 23,16 | 22,36 | 21,32 | 20,73 | 26,21 | 24,87 | 24,32 | 23,46 | 22,36 | 21,74 |
| | dpw | kPa | 11,8 | 10,7 | 10,2 | 9,5 | 8,6 | 8,2 | 12,1 | 10,9 | 10,4 | 9,7 | 8,8 | 8,3 |
| **7** | Pf | kW | 149,4 | 141,9 | 138,7 | 133,8 | 127,6 | 124,1 | 157,0 | 148,9 | 145,6 | 140,4 | 133,9 | 130,1 |
| | Pa | kW | 39,2 | 42,5 | 43,9 | 46,3 | 49,6 | 51,7 | 42,1 | 45,6 | 47,2 | 49,8 | 53,3 | 55,6 |
| | qw | m³/h | 25,64 | 24,34 | 23,80 | 22,96 | 21,90 | 21,29 | 26,94 | 25,56 | 24,98 | 24,10 | 22,97 | 22,33 |
| | dpw | kPa | 12,5 | 11,3 | 10,8 | 10,0 | 9,1 | 8,6 | 12,8 | 11,5 | 11,0 | 10,2 | 9,3 | 8,8 |
| **8** | Pf | kW | 153,5 | 145,6 | 142,4 | 137,4 | 131,0 | 127,3 | 161,2 | 152,9 | 149,5 | 144,1 | 137,4 | 133,5 |
| | Pa | kW | 39,7 | 42,9 | 44,4 | 46,8 | 50,1 | 52,2 | 42,6 | 46,1 | 47,7 | 50,3 | 53,9 | 56,1 |
| | qw | m³/h | 26,35 | 25,00 | 24,44 | 23,58 | 22,48 | 21,86 | 27,68 | 26,25 | 25,66 | 24,74 | 23,58 | 22,92 |
| | dpw | kPa | 13,2 | 11,9 | 11,4 | 10,6 | 9,6 | 9,1 | 13,5 | 12,1 | 11,6 | 10,8 | 9,8 | 9,2 |
| **9** | Pf | kW | 157,6 | 149,5 | 146,1 | 140,9 | 134,4 | 130,6 | 165,6 | 157,0 | 153,4 | 147,9 | 140,9 | 137,0 |
| | Pa | kW | 40,2 | 43,4 | 44,9 | 47,3 | 50,6 | 52,7 | 43,1 | 46,6 | 48,2 | 50,8 | 54,4 | 56,7 |
| | qw | m³/h | 27,07 | 25,68 | 25,10 | 24,21 | 23,08 | 22,44 | 28,44 | 26,96 | 26,35 | 25,40 | 24,21 | 23,53 |
| | dpw | kPa | 13,9 | 12,5 | 12,0 | 11,1 | 10,1 | 9,6 | 14,2 | 12,8 | 12,2 | 11,3 | 10,3 | 9,7 |
| **10** | Pf | kW | 161,8 | 153,4 | 149,9 | 144,6 | 137,8 | 134,0 | 169,9 | 161,1 | 157,4 | 151,7 | 144,6 | 140,5 |
| | Pa | kW | 40,7 | 43,9 | 45,4 | 47,8 | 51,1 | 53,3 | 43,7 | 47,2 | 48,7 | 51,3 | 54,9 | 57,2 |
| | qw | m³/h | 27,84 | 26,40 | 25,80 | 24,88 | 23,71 | 23,05 | 29,24 | 27,71 | 27,08 | 26,10 | 24,88 | 24,18 |
| | dpw | kPa | 14,7 | 13,2 | 12,7 | 11,8 | 10,7 | 10,1 | 15,0 | 13,5 | 12,9 | 12,0 | 10,9 | 10,3 |

**Twout** = Leaving water temperature (°C) ;
**Pf** = Cooling capacity (kW);
**Pa** = Compressors power input (kW);
**qw** = Water flow (m3/h)
**dpw =** Pressure drop (kPa).

**DOMINO EXR SL**
**HEATING PERFORMANCE**

| Ta | | | 2130 | | | | | | | | 2140 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Twout | | | | | | | | Twout | | | | | | | |
| | | | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 |
| -20 | Pt | kW | 114,5 | 112,9 | 111,5 | 110,1 | 109,2 | 108,3 | - | - | 121,0 | 119,3 | 117,7 | 116,3 | 115,4 | 114,5 | - | - |
| | Pat | kW | 29,9 | 32,8 | 36,1 | 39,9 | 44,0 | 48,6 | - | - | 31,5 | 34,6 | 38,1 | 42,1 | 46,4 | 51,2 | - | - |
| | qw | m³/h | 19,83 | 19,60 | 19,38 | 19,18 | 19,40 | 18,94 | - | - | 20,94 | 20,70 | 20,47 | 20,27 | 20,50 | 20,02 | - | - |
| | dpw | kPa | 6,8 | 6,6 | 6,5 | 6,3 | 6,5 | 6,2 | - | - | 7,3 | 7,2 | 7,0 | 6,9 | 7,0 | 6,7 | - | - |
| -10 | Pt | kW | 124,2 | 122,1 | 120,1 | 118,3 | 116,9 | 115,6 | 115,5 | 117,1 | 131,2 | 129,0 | 126,9 | 125,0 | 123,5 | 122,2 | 122,1 | 123,9 |
| | Pat | kW | 30,3 | 33,2 | 36,5 | 40,2 | 44,4 | 49,0 | 54,0 | 59,6 | 31,9 | 35,0 | 38,5 | 42,4 | 46,8 | 51,7 | 57,0 | 62,8 |
| | qw | m³/h | 21,50 | 21,19 | 20,88 | 20,60 | 20,77 | 20,20 | 20,23 | 20,56 | 22,71 | 22,38 | 22,06 | 21,77 | 21,95 | 21,36 | 21,39 | 21,74 |
| | dpw | kPa | 7,9 | 7,7 | 7,5 | 7,3 | 7,4 | 7,0 | 7,0 | 7,3 | 8,6 | 8,4 | 8,1 | 7,9 | 8,0 | 7,6 | 7,6 | 7,9 |
| -5 | Pt | kW | 131,3 | 128,8 | 126,4 | 124,2 | 122,5 | 120,8 | 120,5 | 122,0 | 138,6 | 136,1 | 133,6 | 131,3 | 129,4 | 127,7 | 127,4 | 129,0 |
| | Pat | kW | 30,6 | 33,4 | 36,7 | 40,4 | 44,6 | 49,2 | 54,4 | 59,9 | 32,2 | 35,2 | 38,7 | 42,6 | 47,0 | 51,9 | 57,3 | 63,2 |
| | qw | m³/h | 22,73 | 22,35 | 21,98 | 21,64 | 21,76 | 21,12 | 21,11 | 21,40 | 24,00 | 23,61 | 23,23 | 22,87 | 23,00 | 22,33 | 22,32 | 22,63 |
| | dpw | kPa | 8,9 | 8,6 | 8,3 | 8,1 | 8,1 | 7,7 | 7,7 | 7,9 | 9,6 | 9,3 | 9,0 | 8,7 | 8,8 | 8,3 | 8,3 | 8,6 |
| 0 | Pt | kW | 149,7 | 146,2 | 142,9 | 139,7 | 137,0 | 134,4 | 133,3 | 134,3 | 158,1 | 154,5 | 150,9 | 147,6 | 144,8 | 142,1 | 141,0 | 142,1 |
| | Pat | kW | 31,4 | 34,1 | 37,3 | 41,0 | 45,1 | 49,8 | 55,0 | 60,7 | 33,1 | 36,0 | 39,3 | 43,2 | 47,6 | 52,5 | 58,0 | 64,1 |
| | qw | m³/h | 25,92 | 25,37 | 24,84 | 24,33 | 24,34 | 23,50 | 23,35 | 23,57 | 27,37 | 26,80 | 26,24 | 25,71 | 25,72 | 24,84 | 24,69 | 24,93 |
| | dpw | kPa | 11,5 | 11,1 | 10,6 | 10,2 | 10,2 | 9,5 | 9,4 | 9,6 | 12,5 | 12,0 | 11,5 | 11,0 | 11,1 | 10,3 | 10,2 | 10,4 |
| 7° | Pt | kW | 158,0 | 154,1 | 150,3 | 146,6 | 143,5 | 140,5 | 139,1 | 139,9 | 166,9 | 162,8 | 158,8 | 154,9 | 151,6 | 148,5 | 147,1 | 147,9 |
| | Pat | kW | 31,8 | 34,5 | 37,6 | 41,2 | 45,4 | 50,0 | 55,2 | 61,0 | 33,6 | 36,3 | 39,6 | 43,5 | 47,9 | 52,8 | 58,3 | 64,4 |
| | qw | m³/h | 27,36 | 26,74 | 26,13 | 25,54 | 25,50 | 24,56 | 24,36 | 24,54 | 28,89 | 28,24 | 27,60 | 26,99 | 26,95 | 25,96 | 25,76 | 25,96 |
| | dpw | kPa | 12,9 | 12,3 | 11,7 | 11,2 | 11,2 | 10,4 | 10,2 | 10,4 | 13,9 | 13,3 | 12,7 | 12,2 | 12,1 | 11,3 | 11,1 | 11,3 |

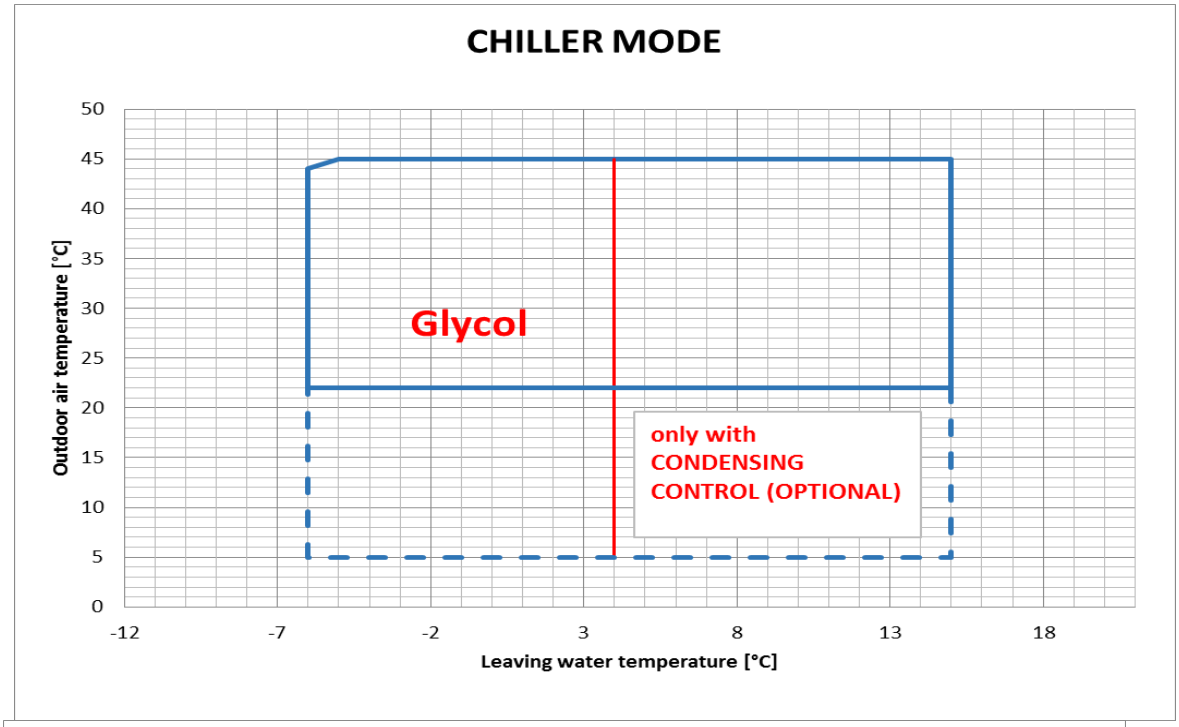
**Ta** = Outdoor temperature (°C)
**Twout** = Leaving water temperature (°C)
**Pt** = Heating capacity (kW)
**Pat** = Compressors power input (kW)
**qw** = Water flow (m3/h)
**dpw =** Pressure drop (kPa)

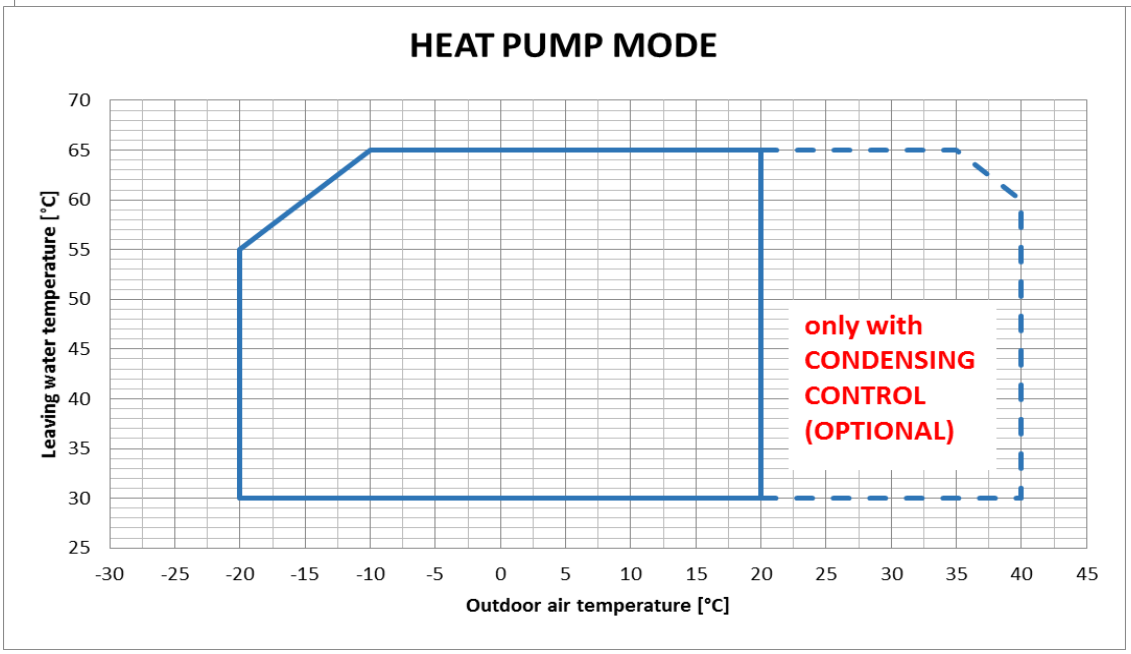
## 7. OPERATING RANGE

| Version | Operating mode | Ta | | Tw out | |
|---|---|---|---|---|---|
| | | Min | Max | Min | Max |
| ZC | Cooling | 5 | 45 | -10 (1) | 15 |
| ZH | Heating | -20 | 40 | 30 | 65 |

(1) Operating mode with glycol

Ta = Outdoor air temperature (°C)
Tw out = Heat exchanger outlet water temperature (°C)



## WATER VOLUMES OPTIMAL FOR THE PLANT
## DOMINO EXR SL

| Model | Cooling mode | | | | Heating mode | | | |
|---|---|---|---|---|---|---|---|---|
| | V | K | Q min | Q max | V | K | Q min | Q max |
| | [m^3] | | [m^3/h] | [m^3/h] | [m^3] | | [m^3/h] | [m^3/h] |
| **120 ZH** | 0,2 | 888,5 | 2,1 | 5,6 | 0,5 | 773,8 | 2,3 | 6,2 |
| **125 ZH** | 0,2 | 619,4 | 2,6 | 6,8 | 0,7 | 541,4 | 2,9 | 7,6 |
| **128 ZH** | 0,2 | 486,4 | 2,9 | 7,7 | 0,7 | 428,2 | 3,2 | 8,5 |
| **130 ZH** | 0,3 | 415,3 | 3,2 | 8,6 | 0,8 | 365,9 | 3,6 | 9,5 |
| **135 ZH** | 0,3 | 360,6 | 3,6 | 9,5 | 0,9 | 318,3 | 4,0 | 10,7 |
| **140 ZH** | 0,3 | 264,7 | 4,2 | 11,1 | 1,1 | 236,2 | 4,7 | 12,5 |
| **150 ZH** | 0,4 | 191,0 | 5,3 | 14,1 | 1,4 | 147,3 | 6,1 | 16,4 |
| **160 ZH** | 0,5 | 153,5 | 6,1 | 16,3 | 1,6 | 130,1 | 7,0 | 18,8 |
| **170 ZH** | 0,6 | 116,1 | 7,1 | 18,9 | 1,8 | 99,2 | 8,0 | 21,2 |
| **175 ZH** | 0,6 | 100,1 | 7,7 | 20,7 | 2,0 | 85,2 | 8,8 | 23,4 |
| **285 ZH** | 0,7 | 41,1 | 8,9 | 23,6 | 2,4 | 36,1 | 10,4 | 27,8 |
| **295 ZH** | 0,8 | 35,2 | 9,9 | 26,3 | 2,7 | 30,8 | 11,7 | 31,2 |
| **2110 ZH** | 0,9 | 26,1 | 11,5 | 30,7 | 3,1 | 23,1 | 13,5 | 36,0 |
| **2130 ZH** | 1,1 | 18,9 | 13,7 | 36,5 | 3,6 | 16,8 | 15,8 | 42,0 |
| **2140 ZH** | 1,2 | 18,3 | 14,4 | 38,4 | 3,8 | 16,3 | 16,7 | 44,4 |
| **2145 ZH** | 1,2 | 16,9 | 15,1 | 40,3 | 4,0 | 15,0 | 17,5 | 46,6 |

**LEGENDA**:

**V**: recommended water content of the plant with dT 5°C on the heat exchanger
**Q min**: minimum water flow to the heat exchanger
**Q max**: maximum water flow to the heat exchanger
**dpw** = $K \cdot Q^2 / 1000$
**Q** = 0,86 P/ΔT
**P**: Heating or cooling capacity [kW]
**Δt**: ΔT at the heat exchanger (min = 3, max = 8) [°C]
**Δt**: ΔT at the desuperheater = 4°C
**dpw**: Pressure drop [kPa]

## 11. ACOUSTIC DATA

**DOMINO EXR**

| Model | Octave band (Hz) Sound pressure level (dB) 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | Lw dB(A) |
|---|---|---|---|---|---|---|---|---|---|
| 120 ZH | 54,0 | 50,0 | 45,4 | 41,2 | 38,8 | 54,0 | 36,5 | 25,5 | 76,2 |
| 125 ZH | 55,2 | 51,2 | 46,6 | 42,4 | 40,0 | 55,2 | 37,7 | 26,7 | 77,4 |
| 128 ZH | 56,0 | 52,0 | 47,4 | 43,2 | 40,8 | 56,0 | 38,5 | 27,5 | 78,2 |
| 130 ZH | 56,0 | 52,0 | 47,4 | 43,2 | 40,8 | 56,0 | 38,5 | 27,5 | 78,2 |
| 135 ZH | 57,8 | 53,8 | 49,2 | 45,0 | 42,6 | 57,8 | 40,3 | 29,3 | 80,0 |
| 140 ZH | 58,7 | 54,7 | 50,1 | 45,9 | 43,5 | 58,7 | 41,2 | 30,2 | 81,0 |
| 150 ZH | 60,5 | 56,5 | 51,9 | 47,7 | 45,3 | 60,5 | 43,0 | 32,0 | 83,0 |
| 160 ZH | 61,5 | 57,5 | 52,9 | 48,7 | 46,3 | 61,5 | 44,0 | 33,0 | 84,0 |
| 170 ZH | 61,5 | 57,5 | 52,9 | 48,7 | 46,3 | 61,5 | 44,0 | 33,0 | ,84,0 |
| 175 ZH | 61,5 | 57,5 | 52,9 | 48,7 | 46,3 | 61,5 | 44,0 | 33,0 | 84,0 |
| 285 ZH | 62,3 | 58,3 | 53,7 | 49,5 | 47,1 | 62,3 | 44,8 | 33,8 | 85,0 |
| 295 ZH | 62,3 | 58,3 | 53,7 | 49,5 | 47,1 | 62,3 | 44,8 | 33,8 | 85,0 |
| 2110 ZH | 63,3 | 59,3 | 54,7 | 50,5 | 48,1 | 63,3 | 45,8 | 34,8 | 86,0 |
| 2130 ZH | 64,3 | 60,3 | 55,7 | 51,5 | 49,1 | 64,3 | 46,8 | 35,8 | 87,0 |
| 2140 ZH | 64,3 | 60,3 | 55,7 | 51,5 | 49,1 | 64,3 | 46,8 | 35,8 | 87,0 |
| 2145 ZH | 64,3 | 60,3 | 55,7 | 51,5 | 49,1 | 64,3 | 46,8 | 35,8 | 87,0 |

**DOMINO EXR SL**

| Model | Octave band (Hz) Sound pressure level (dB) 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | Lw dB(A) |
|---|---|---|---|---|---|---|---|---|---|
| 120 ZH | - | - | - | - | - | - | - | - | - |
| 125 ZH | - | - | - | - | - | - | - | - | - |
| 128 ZH | - | - | - | - | - | - | - | - | - |
| 130 ZH | - | - | - | - | - | - | - | - | - |
| 135 ZH | - | - | - | - | - | - | - | - | - |
| 140 ZH | 53,8 | 49,8 | 45,2 | 41,0 | 38,6 | 53,8 | 36,3 | 25,3 | 76,1 |
| 150 ZH | 55,7 | 51,7 | 47,1 | 42,9 | 40,5 | 55,7 | 38,2 | 27,2 | 78,2 |
| 160 ZH | 56,6 | 52,6 | 48,0 | 43,8 | 41,4 | 56,6 | 39,1 | 28,1 | 79,1 |
| 170 ZH | 56,8 | 52,8 | 48,2 | 44,0 | 41,6 | 56,8 | 39,3 | 28,3 | 79,3 |
| 175 ZH | 57,0 | 53,0 | 48,4 | 44,2 | 41,8 | 57,0 | 39,5 | 28,5 | 79,5 |
| 285 ZH | 57,7 | 53,7 | 49,1 | 44,9 | 42,5 | 57,7 | 40,2 | 29,2 | 80,3 |
| 295 ZH | 61,2 | 57,2 | 52,6 | 48,4 | 46,0 | 61,2 | 43,7 | 32,7 | 83,9 |
| 2110 ZH | 58,6 | 54,6 | 50,0 | 45,8 | 43,4 | 58,6 | 41,1 | 30,1 | 81,2 |
| 2130 ZH | 59,7 | 55,7 | 51,1 | 46,9 | 44,5 | 59,7 | 42,2 | 31,2 | 82,3 |
| 2140 ZH | 60,1 | 56,1 | 51,5 | 47,3 | 44,9 | 60,1 | 42,6 | 31,6 | 82,8 |
| 2145 ZH | 59,8 | 55,8 | 51,2 | 47,0 | 44,6 | 59,8 | 42,3 | 31,3 | 82,5 |