

## Základné údaje o výkone - WAMAK TBW 100 EVI HeavyDuty 2L1

| Vykurovanie - EN 14511                                        |                    |                      |
|---------------------------------------------------------------|--------------------|----------------------|
| Tepelný výkon [kW]                                            | B0 / W35 (max)     | 96.1 ( 48.1 / 96.1 ) |
|                                                               | B0 / W35 (min)     | 48.1 ( 48.1 / 96.1 ) |
|                                                               | B0 / W34           | 96.0 ( 48.0 / 96.0 ) |
| Elektrický príkon [kW]                                        | B0 / W35 (max)     | 21.7 ( 10.7 / 21.7 ) |
|                                                               | B0 / W35 (min)     | 10.7 ( 10.7 / 21.7 ) |
|                                                               | B0 / W34           | 21.2 ( 10.5 / 21.2 ) |
| Tepelná účinnosť [COP]                                        | B0 / W35 (max)     | 4.43                 |
|                                                               | B0 / W35 (min)     | 4.49                 |
|                                                               | B0 / W34           | 4.52                 |
| Sezónna tepelná účinnosť vykurovania - SCOP EN 14825          |                    |                      |
| Stredná klim. zóna / Nízka teplota [35 °C]                    | SCOP               | 5.01                 |
|                                                               | η [ % ]            | 200.3                |
|                                                               | Label              | A+++                 |
|                                                               | Qhe [ kWh ]        | 39612.5              |
|                                                               | Pdesignh [ kW ]    | 96.1                 |
|                                                               | Tbivalent [ °C ]   | -10                  |
| Chladenie                                                     |                    |                      |
| Chladiaci výkon - [kW]                                        | A35 / W23-18       | 96.9                 |
|                                                               | A25 / W23-18       | 101.8                |
|                                                               | A35 / W12-7        | 96.9                 |
|                                                               | A25 / W12-7        | 96.9                 |
| Sezónna účinnosť chladenia - SEER EN 14825                    |                    |                      |
| [ W 23 / 18 °C ]                                              | SEER               | 5.14                 |
|                                                               | Qce [ kWh ]        | 10682.5              |
|                                                               | ηc [ % ]           | 205.7                |
| Zvuk EN 12102                                                 |                    |                      |
| Zvuk - výkon - Lw                                             | dB(A)              | 65.9                 |
| Zvuk - tlak - Lp                                              | 1 m dB(A)          | 57.9                 |
|                                                               | 5 m dB(A)          | 43.9                 |
|                                                               | 10 m dB(A)         | 37.9                 |
| Strojné a prevádzkové informácie                              |                    |                      |
| Typ kompresoru (3~ 400/50)                                    | SCROLL / 2 /       | Zap/Vyp              |
| Chladivo                                                      | R410A (GWP - 2088) | 11.5 kg              |
| Prevádzkové hraničné teploty vykurovania - (min / max ) [ °C] | 25 / 65            |                      |
| Prevádzkové hraničné teploty zdroja - (min / max ) [ °C]      | -10 (7) / 30       |                      |
| Váha zariadenia                                               | 620 kg             |                      |

Hlavné technické údaje - WAMAK TBW 100 EVI HeavyDuty 2L1

| Označenie krytovania                 |                          |                   | HD2L1         |                                              | Údaje strany odovzdania tepelnej energie |             |              |
|--------------------------------------|--------------------------|-------------------|---------------|----------------------------------------------|------------------------------------------|-------------|--------------|
| Základné rozmery                     | Výška [mm]               | 2000              |               | Prevádzkové hraničné teploty vykurovania     | MAX [°C]                                 | 65          |              |
|                                      | Šírka [mm]               | 820               |               |                                              | MIN [°C]                                 | 25          |              |
|                                      | Dĺžka [mm]               | 1200              |               | viac vid. diagram prevádzkových limitov      |                                          |             |              |
| Váha zariadenia [kg]                 |                          | 620               |               | Kondenzátor                                  | Pripojovacia dimenzia                    | VIC 2.1/2 " |              |
| Farba krytovania                     |                          | Sivá              |               |                                              | Typ                                      | BPHE        |              |
| IP trieda krytovania                 |                          | IP20              |               |                                              | Počet                                    | 1           |              |
|                                      |                          |                   |               |                                              | Materiál                                 | AISI 316    |              |
| Chladivový okruh                     |                          |                   |               |                                              |                                          |             |              |
| Kompresor                            | Typ                      | Scroll            |               | Maximálny prevádzkový tlak - chladivo [bar]  |                                          |             | 50           |
|                                      | Výkonové stupne          | 2                 |               | Maximálny prevádzkový tlak - Voda [bar]      |                                          |             | 6            |
|                                      | Zap/Vyp                  |                   |               | Testovací pretlak [bar]                      |                                          |             | 70           |
|                                      | Účinník Cosφ             | 0.64              |               | Teplonosné médium                            |                                          |             | Voda         |
|                                      | Odpor vynutia kompresora | 0.76 Ohm          |               | Objemový prietok @ dT 5K (nom) - Voda [m3/h] |                                          |             | 8.32 ~ 16.63 |
| Chladivo                             |                          | R410A             |               | Vnútorná tlaková strata - Voda [kPa]         |                                          |             | 20           |
|                                      | Objem                    | 11.5 kg           |               | Teplotný spád                                | @ 35°C (nom)                             | 5 K         |              |
|                                      | GWP                      | 2088              |               |                                              | @ 55°C                                   | 8 K         |              |
|                                      | Bezpečnostná trieda      | A1                |               |                                              | @ 65°C                                   | 10 K        |              |
|                                      | Typ oleja v okruhu       | POE RL32-3MAF     |               | Údaje strany odberu obnoviteľnej energie     |                                          |             |              |
| Objem oleja                          |                          | 2 x 3.38 L        |               | Prevádzkové hraničné teploty zdroja          | MIN [°C]                                 | -10 (7)     |              |
| Maximálny tlak chladiva [bar]        |                          | 50                |               |                                              | MAX [°C]                                 | 30          |              |
|                                      |                          | PED trieda        |               | viac vid. diagram prevádzkových limitov      |                                          |             |              |
| EVI - vstrek chladiva s ekonomizérom |                          |                   |               |                                              |                                          |             |              |
| Údaje elektrického pripojenia        |                          |                   |               |                                              |                                          |             |              |
| Elektro napájanie [#~ V/Hz]          |                          | 3~ 400/50         |               |                                              |                                          |             |              |
| Prúd                                 | nominálny [A]            | 46.70             |               |                                              |                                          |             |              |
|                                      | maximálny [A]            | 74.80             |               |                                              |                                          |             |              |
|                                      | štartovací [A]           | 63.04             |               |                                              |                                          |             |              |
| Softštartér                          |                          | -                 |               |                                              |                                          |             |              |
| Hlavný istič - charakteristika       |                          | C80               |               |                                              |                                          |             |              |
| Riadiaci systém                      |                          |                   |               |                                              |                                          |             |              |
| Hlavný regulátor                     |                          | SIEMENS RVS 61    |               |                                              |                                          |             |              |
| Rozširovací modul                    | AVS75.3xx                | AVS75.3xx         | AVS75.372     |                                              |                                          |             |              |
| Bus Clip-In                          |                          | LPB OCI345        | Modbus OCI351 |                                              |                                          |             |              |
| Online pripojenie                    |                          | Web server OZW672 | ToSyMo        |                                              |                                          |             |              |
| Regulácia EEV                        |                          | SEC61             |               |                                              |                                          |             |              |
| *** s príslušenstvom                 |                          |                   |               |                                              |                                          |             |              |

# WAMAK TBW 100 EVI HeavyDuty 2L1

## ErP (EU) No 811/2013: Technické parametre vykurovacích zariadení s tepelným čerpadlom

| Model                                     | TBW 100 EVI HeavyDuty 2L1     |
|-------------------------------------------|-------------------------------|
| Tepelné čerpadlo vzduch-voda              | nie                           |
| Tepelné čerpadlo soľanka-voda             | áno                           |
| Tepelné čerpadlo voda-voda                | nie                           |
| Nízkotepelné tepelné čerpadlo             | nie                           |
| Vybavené prídavným ohrievačom             | nie                           |
| Kombinované tepelné čerpadlo s ohrievačom | nie                           |
| Teplotné použitie                         | nízka teplota (35 °C - 30 °C) |
| Klimatická oblasť                         | priemerná                     |

| Položka                                                                                                  | Symbol | Hodnota         | mj  | Položka                                                                                                                               | Symbol | Hodnota      | mj   |
|----------------------------------------------------------------------------------------------------------|--------|-----------------|-----|---------------------------------------------------------------------------------------------------------------------------------------|--------|--------------|------|
| Menovitý tepelný výkon pri Tdesignh                                                                      | Prated | 96.1            | kW  | Sezónna energetická účinnosť vykurovania priestoru                                                                                    | ηs     | 200.3        | %    |
| Deklarovaný výkon vykurovania pri čiastočnom zaťažení pri vnútornej teplote 20 °C a vonkajšej teplote Tj |        |                 |     | Deklarovaný súčiniteľ výkonu alebo pomer primárnej energie pre čiastočné zaťaženie pri vnútornej teplote 20 °C a vonkajšej teplote Tj |        |              |      |
| Tj = -7 °C                                                                                               | Pdh    | 96.0            | kW  | Tj = -7 °C                                                                                                                            | COPd   | 4.52         | -    |
| Tj = +2 °C                                                                                               | Pdh    | 95.5            | kW  | Tj = +2 °C                                                                                                                            | COPd   | 4.9          | -    |
| Tj = +7 °C                                                                                               | Pdh    | 95.0            | kW  | Tj = +7 °C                                                                                                                            | COPd   | 5.3          | -    |
| Tj = +12 °C                                                                                              | Pdh    | 94.5            | kW  | Tj = +12 °C                                                                                                                           | COPd   | 5.7          | -    |
| Tj = bivalentná teplota                                                                                  | Pdh    | 96.1            | kW  | Tj = bivalentná teplota                                                                                                               | COPd   | 4.4          | -    |
| Tj = hraničná prevádzková teplota                                                                        | Pdh    | ---             | kW  | Tj = hraničná prevádzková teplota                                                                                                     | COPd   | ---          | -    |
| Bivalentná teplota                                                                                       | Tbiv   | -10             | °C  | Tj = hraničná prevádzková teplota                                                                                                     | TOL    | ---          | °C   |
| Spotreba energie v iných ako aktívnych režimoch                                                          |        |                 |     | Medzná prevádzková teplota vykurovacej vody                                                                                           | WTOL   | 65           | °C   |
| Vypnuté                                                                                                  | Poff   | 0.010           | kW  | Prídavný ohrievač                                                                                                                     |        |              |      |
| Režim vypnutia termostatu                                                                                | Pto    | 0.010           | kW  | Menovitý tepelný výkon                                                                                                                | Psup   | 18.5         | kW   |
| Pohotovostný režim                                                                                       | Psb    | 0.010           | kW  | Typ príkonu energie                                                                                                                   |        | elektrická   |      |
| Režim ohrevu kľukovej skrine                                                                             | Pck    | 0.000           | kW  |                                                                                                                                       |        |              |      |
| Ostatné položky                                                                                          |        |                 |     |                                                                                                                                       |        |              |      |
| Regulácia výkonu                                                                                         |        | viacero stupňov |     | Pre tepelné čerpadlá vzduch-voda: Menovitý prietok vzduchu, vonku                                                                     | -      | ---          | m3/h |
| Úroveň akustického výkonu                                                                                |        |                 |     | Pre tepelné čerpadlá voda-voda alebo soľanka-voda: Menovitý prietok soľanky alebo vody, vonkajší výmenník tepla                       | -      | 8.48 ~ 16.96 | m3/h |
| v interiéri                                                                                              | Lwa    | 66              | dB  |                                                                                                                                       |        |              |      |
| vonku                                                                                                    | Lwa    | ---             | dB  |                                                                                                                                       |        |              |      |
| Ročná spotreba energie                                                                                   | QHE    | 39612.5         | kWh |                                                                                                                                       |        |              |      |

**Kontaktné údaje:** WAMAK, s.r.o., Orovnica 252, 96652, Orovnica, Slovakia, info@wamak.sk

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## ErP (EU) No 811/2013: Technické parametre vykurovacích zariadení s tepelným čerpadlom

| Model                                     | TBW 100 EVI HeavyDuty 2L1    |
|-------------------------------------------|------------------------------|
| Tepelné čerpadlo vzduch-voda              | nie                          |
| Tepelné čerpadlo soľanka-voda             | áno                          |
| Tepelné čerpadlo voda-voda                | nie                          |
| Nízkoteplotné tepelné čerpadlo            | nie                          |
| Vybavené prídavným ohrievačom             | nie                          |
| Kombinované tepelné čerpadlo s ohrievačom | nie                          |
| Teplotné použitie                         | stredá teplota (55°C - 47°C) |
| Klimatická oblasť                         | priemerná                    |

| Položka                                                                                                  | Symbol | Hodnota         | mj  | Položka                                                                                                                               | Symbol | Hodnota      | mj   |
|----------------------------------------------------------------------------------------------------------|--------|-----------------|-----|---------------------------------------------------------------------------------------------------------------------------------------|--------|--------------|------|
| Menovitý tepelný výkon pri Tdesignh                                                                      | Prated | 98.3            | kW  | Sezónna energetická účinnosť vykurovania priestoru                                                                                    | ηs     | 160.5        | %    |
| Deklarovaný výkon vykurovania pri čiastočnom zaťažení pri vnútornej teplote 20 °C a vonkajšej teplote Tj |        |                 |     | Deklarovaný súčiniteľ výkonu alebo pomer primárnej energie pre čiastočné zaťaženie pri vnútornej teplote 20 °C a vonkajšej teplote Tj |        |              |      |
| Tj = -7 °C                                                                                               | Pdh    | 98.9            | kW  | Tj = -7 °C                                                                                                                            | COPd   | 3.29         | -    |
| Tj = +2 °C                                                                                               | Pdh    | 98.9            | kW  | Tj = +2 °C                                                                                                                            | COPd   | 4.1          | -    |
| Tj = +7 °C                                                                                               | Pdh    | 97.2            | kW  | Tj = +7 °C                                                                                                                            | COPd   | 4.6          | -    |
| Tj = +12 °C                                                                                              | Pdh    | 96.7            | kW  | Tj = +12 °C                                                                                                                           | COPd   | 5.0          | -    |
| Tj = bivalentná teplota                                                                                  | Pdh    | 98.3            | kW  | Tj = bivalentná teplota                                                                                                               | COPd   | 2.9          | -    |
| Tj = hraničná prevádzková teplota                                                                        | Pdh    | ---             | kW  | Tj = hraničná prevádzková teplota                                                                                                     | COPd   | ---          | -    |
| Bivalentná teplota                                                                                       | Tbiv   | -10             | °C  | Tj = hraničná prevádzková teplota                                                                                                     | TOL    | ---          | °C   |
| Spotreba energie v iných ako aktívnych režimoch                                                          |        |                 |     | Medzná prevádzková teplota vykurovacej vody                                                                                           | WTOL   | 65           | °C   |
| Vypnuté                                                                                                  | Poff   | 0.010           | kW  | Prídavný ohrievač                                                                                                                     |        |              |      |
| Režim vypnutia termostatu                                                                                | Pto    | 0.010           | kW  | Menovitý tepelný výkon                                                                                                                | Psup   | 18.5         | kW   |
| Pohotovostný režim                                                                                       | Psb    | 0.010           | kW  | Typ príkonu energie                                                                                                                   |        | elektrická   |      |
| Režim ohrevu kľukovej skrine                                                                             | Pck    | 0.000           | kW  |                                                                                                                                       |        |              |      |
| Ostatné položky                                                                                          |        |                 |     |                                                                                                                                       |        |              |      |
| Regulácia výkonu                                                                                         |        | viacero stupňov |     | Pre tepelné čerpadlá vzduch-voda: Menovitý prietok vzduchu, vonku                                                                     | -      | ---          | m3/h |
| Úroveň akustického výkonu                                                                                |        |                 |     | Pre tepelné čerpadlá voda-voda alebo soľanka-voda: Menovitý prietok soľanky alebo vody, vonkajší výmenník tepla                       | -      | 8.48 ~ 16.96 | m3/h |
| v interiéri                                                                                              | Lwa    | 66              | dB  |                                                                                                                                       |        |              |      |
| vonku                                                                                                    | Lwa    | ---             | dB  |                                                                                                                                       |        |              |      |
| Ročná spotreba energie                                                                                   | QHE    | 50568.0         | kWh |                                                                                                                                       |        |              |      |

**Kontaktné údaje:** WAMAK, s.r.o., Orovnica 252, 96652, Orovnica, Slovakia, info@wamak.sk



# ENERG

енергия - ενεργεια



## WAMAK

TBW 100 EVI  
HeavyDuty 2L1



55 °C

35 °C

A+++

A+++

A+++

A++

A+

A

B

C

D



66 dB



--- dB

■ 104  
■ 99  
■ 97  
kW

■ 99  
■ 97  
■ 92  
kW



2019

811/2013

TBW 100 EVI  
HeavyDuty 2L1

### ErP Data

55 °C

35 °C

Energy class

A+++

A+++

$\eta$  [%]

160.5

200.3

$P_{rated}$  [kW]

99

97

$Q_{HE}$  [kWh/y]

50568

39613

SCOP [-]

4.01

5.01

$T_{bivalent}$  [°C]

-10

-10

CONTROLLER



+ QAA55/75

class VII

3.5% ↓

- QAA55/75

class III

1.5% ↓

Tepelný výkon - prevádzkové dáta

Version: v2024.004-BW-WW

Zdroj - soľanka [0°C] / Nízka teplota [35°C]

ZHI46K1P-TWD\_R410A\_2\_BWW

|   | Prevádzkový bod     | Qh   | P    | COP  |
|---|---------------------|------|------|------|
| 1 | B0 / W30-35         | 96.1 | 21.7 | 4.43 |
| 2 | B0 / W30-35 ( MIN ) | 48.1 | 10.7 | 4.49 |
| A | B0 / Wxx-34         | 96.0 | 21.2 | 4.52 |
| B | B0 / Wxx-30         | 95.5 | 19.4 | 4.92 |
| C | B0 / Wxx-27         | 47.5 | 8.9  | 5.32 |
| D | B0 / Wxx-24         | 47.3 | 8.3  | 5.68 |
| E | B0 / Wxx-35         | 96.1 | 21.7 | 4.43 |
| F | B0 / Wxx-35         | 96.1 | 21.7 | 4.43 |

| SCOP DATA EN 14825:2018                      |        |
|----------------------------------------------|--------|
| Zdroj - soľanka [0°C] / Nízka teplota [35°C] |        |
| SCOPon                                       | 5.01   |
| SCOPnet                                      | 5.01   |
| SCOP                                         | 5.01   |
| η [ % ]                                      | 200.25 |
| Label                                        | A+++   |
| Qh [ kWh ]                                   | 198543 |
| Pdesignh [ kW ]                              | 96.1   |
| Tbivalent [ °C ]                             | -10    |

Zdroj - soľanka [0°C] / Stredná teplota [55°C]

|   | Prevádzkový bod     | Qh   | P    | COP  |
|---|---------------------|------|------|------|
| 1 | B0 / W47-55         | 98.3 | 34.0 | 2.89 |
| 2 | B0 / W47-55 ( MIN ) | 49.1 | 16.5 | 2.93 |
| A | B0 / Wxx-52         | 98.9 | 31.0 | 3.29 |
| B | B0 / Wxx-42         | 98.9 | 24.2 | 4.13 |
| C | B0 / Wxx-36         | 48.6 | 10.6 | 4.59 |
| D | B0 / Wxx-30         | 48.3 | 9.6  | 5.05 |
| E | B0 / Wxx-55         | 98.3 | 34.0 | 2.89 |
| F | B0 / Wxx-54         | 99.0 | 31.8 | 3.12 |

| SCOP DATA EN 14825:2018                        |        |
|------------------------------------------------|--------|
| Zdroj - soľanka [0°C] / Stredná teplota [55°C] |        |
| SCOPon                                         | 4.02   |
| SCOPnet                                        | 4.02   |
| SCOP                                           | 4.01   |
| η [ % ]                                        | 160.49 |
| Label                                          | A+++   |
| Qh [ kWh ]                                     | 203088 |
| Pdesignh [ kW ]                                | 98.3   |
| Tbivalent [ °C ]                               | -10    |

Zdroj - voda [10°C] / Nízka teplota [35°C]

|   | Prevádzkový bod      | Qh    | P    | COP  |
|---|----------------------|-------|------|------|
| 1 | W10 / W30-35         | 121.2 | 21.7 | 5.58 |
| 2 | W10 / W30-35 ( MIN ) | 60.6  | 10.7 | 5.66 |
| A | W10 / Wxx-34         | 121.2 | 21.2 | 5.70 |
| B | W10 / Wxx-30         | 121.3 | 19.5 | 6.21 |
| C | W10 / Wxx-27         | 60.6  | 9.0  | 6.72 |
| D | W10 / Wxx-24         | 60.6  | 8.5  | 7.16 |
| E | W10 / Wxx-35         | 121.2 | 21.7 | 5.58 |
| F | W10 / Wxx-35         | 121.2 | 21.7 | 5.58 |

| SCOP DATA EN 14825:2018                    |        |
|--------------------------------------------|--------|
| Zdroj - voda [10°C] / Nízka teplota [35°C] |        |
| SCOPon                                     | 6.33   |
| SCOPnet                                    | 6.33   |
| SCOP                                       | 6.32   |
| η [ % ]                                    | 252.96 |
| Label                                      | A+++   |
| Qh [ kWh ]                                 | 250399 |
| Pdesignh [ kW ]                            | 121.2  |
| Tbivalent [ °C ]                           | -10.00 |

**Zdroj - voda [10°C] / Stredná teplota [55°C]**

|   | Prevádzkový bod      | Qh    | P    | COP  |
|---|----------------------|-------|------|------|
| 1 | W10 / W47-55         | 120.9 | 34.0 | 3.55 |
| 2 | W10 / W47-55 ( MIN ) | 60.5  | 16.8 | 3.60 |
| A | W10 / Wxx-52         | 122.1 | 31.0 | 3.94 |
| B | W10 / Wxx-42         | 122.4 | 24.2 | 5.06 |
| C | W10 / Wxx-36         | 61.3  | 10.6 | 5.79 |
| D | W10 / Wxx-30         | 61.3  | 9.6  | 6.37 |
| E | W10 / Wxx-55         | 120.9 | 34.0 | 3.55 |
| F | W10 / Wxx-55         | 120.9 | 34.0 | 3.55 |

| SCOP DATA EN 14825:2018                      |        |
|----------------------------------------------|--------|
| Zdroj - voda [10°C] / Stredná teplota [55°C] |        |
| SCOPon                                       | 4.91   |
| SCOPnet                                      | 4.91   |
| SCOP                                         | 4.91   |
| η [ % ]                                      | 196.37 |
| Label                                        | A+++   |
| Qh [ kWh ]                                   | 249779 |
| Pdesignh [ kW ]                              | 120.9  |
| Tbivalent [ °C ]                             | -10.00 |

**Nízkoteplotné chladenie W 12 / 7°C**

|   | Prevádzkový bod | Qc   | P    | EER  |
|---|-----------------|------|------|------|
| A | W30-35 / W12-7  | 74.8 | 23.2 | 3.22 |
| B | W26-xx / W12-7  | 76.2 | 21.2 | 3.59 |
| C | W22-xx / W12-7  | 77.3 | 19.4 | 3.98 |
| D | W18-xx / W12-7  | 77.9 | 18.6 | 4.20 |

| SEER DATA EN 14825:2018 [ W 12 / 7°C ] |        |
|----------------------------------------|--------|
| SEERon                                 | 3.86   |
| SEER                                   | 3.86   |
| Qc [ kWh ]                             | 43680  |
| η [ % ]                                | 154.44 |

**Plošné chladenie W 23 / 18°C**

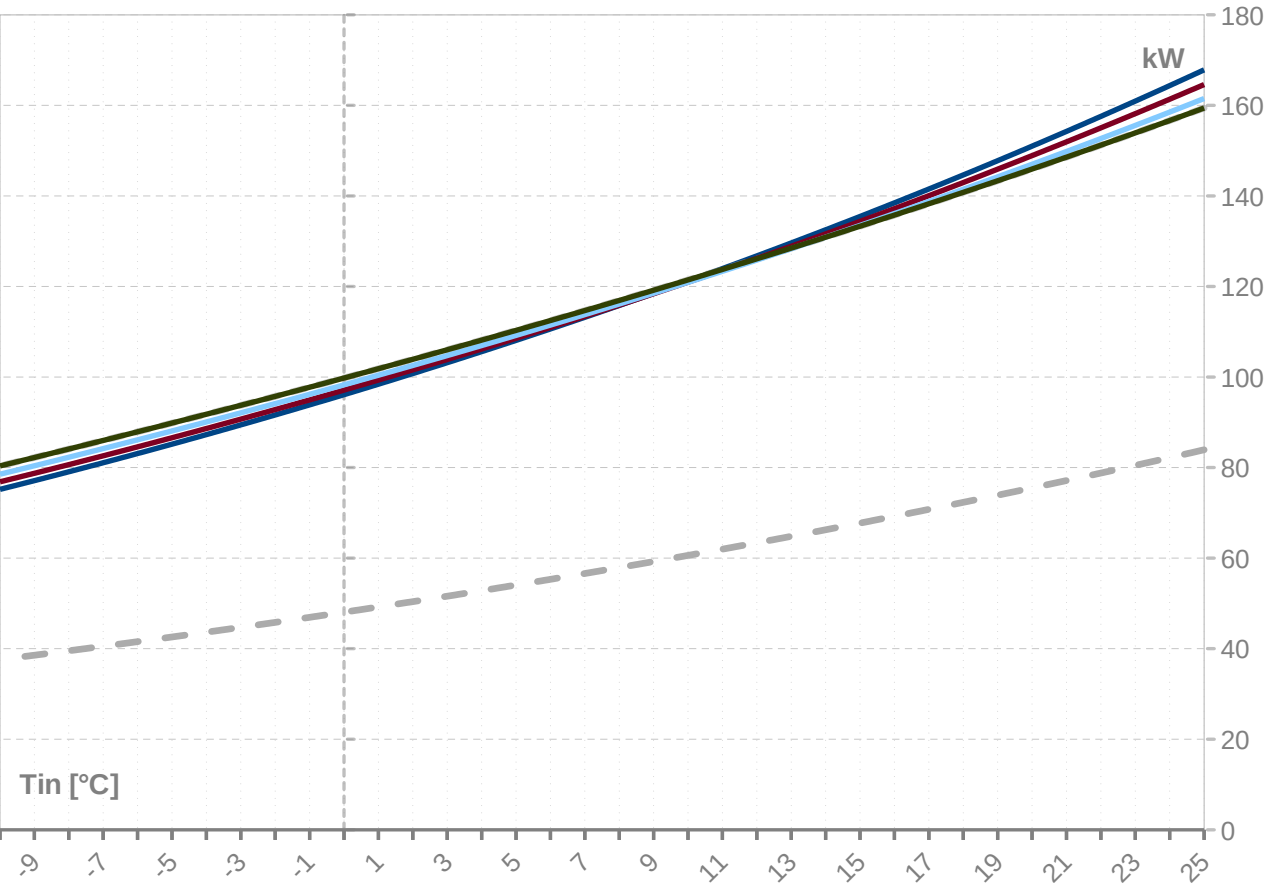
|   | Prevádzkový bod | Qc    | P    | EER  |
|---|-----------------|-------|------|------|
| A | W50-xx / W23-18 | 86.9  | 36.5 | 2.38 |
| B | W40-xx / W23-18 | 93.9  | 29.0 | 3.24 |
| C | W30-35 / W23-18 | 99.5  | 23.2 | 4.29 |
| D | W26-xx / W23-18 | 101.4 | 21.2 | 4.77 |

| SEER DATA EN 14825:2018 [ W 23 / 18°C ] |        |
|-----------------------------------------|--------|
| SEERon                                  | 5.15   |
| SEER                                    | 5.14   |
| Qc [ kWh ]                              | 43680  |
| η [ % ]                                 | 205.69 |

Výkonové kryvky - vykurovanie

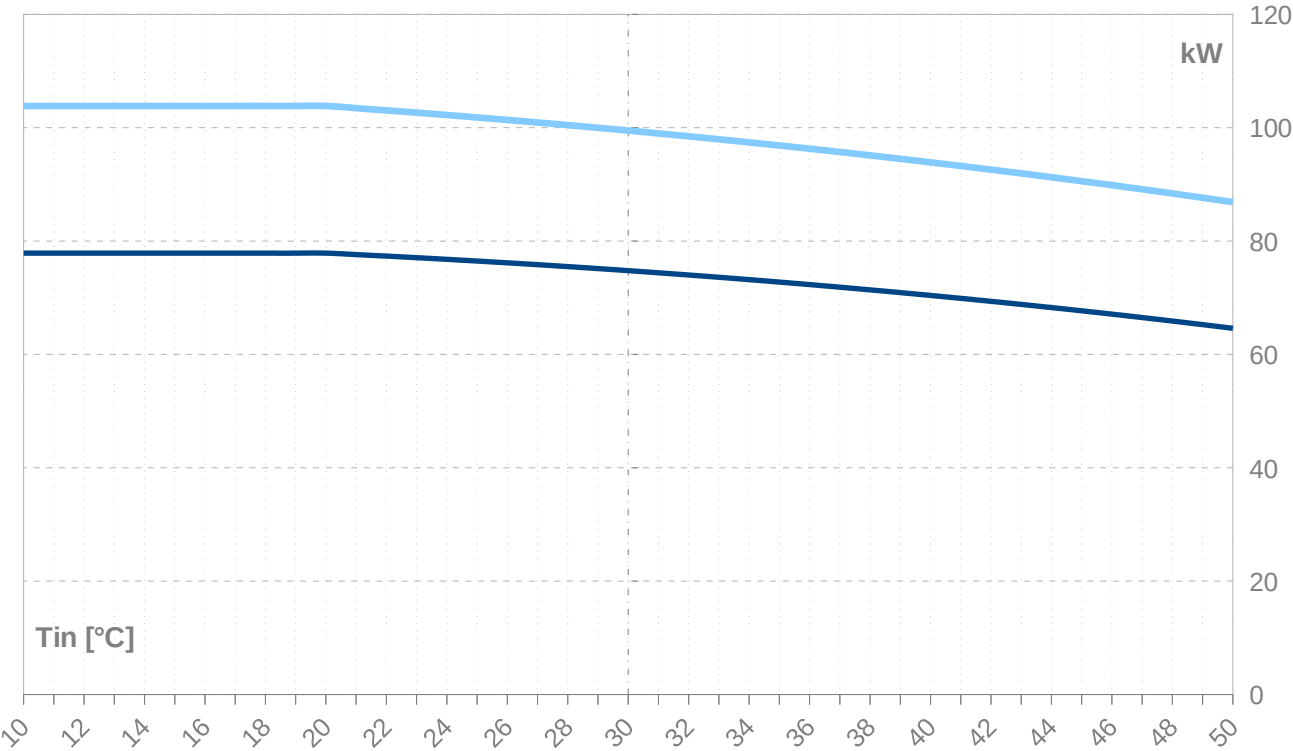
ZHI46K1P-TWD\_R410A\_2\_BWW

Qh-nom-35    Qh-min-35    Qh-max-65    Qh-nom-45    Qh-nom-55  
Qh-nom-65



Výkonové kryvky - chladenie

Qc-nom-12-7    Qc-nom-23-18



| Tv<br>-VY | 35        |           |           |            |            |            |            |           |           |           |          |
|-----------|-----------|-----------|-----------|------------|------------|------------|------------|-----------|-----------|-----------|----------|
| Tz<br>-VS | Qh<br>nom | Qh<br>min | Qh<br>max | Pin<br>nom | Pin<br>min | Pin<br>max | COP<br>nom | Qc<br>nom | Qc<br>min | Qc<br>max | I<br>nom |
| [°C]      | [kW]      | [kW]      | [kW]      | [kW]       | [kW]       | [kW]       | kW / kW    | [kW]      | [kW]      | [kW]      | [A]      |
| 25        | 167.8     | 83.9      | 167.8     | 22.1       | 10.9       | 22.1       | 7.59       | 147.2     | 73.6      | 147.2     | 46.8     |
| 24        | 164.4     | 82.2      | 164.4     | 22.1       | 10.9       | 22.1       | 7.45       | 143.8     | 71.9      | 143.8     | 46.7     |
| 23        | 160.9     | 80.5      | 160.9     | 22.0       | 10.9       | 22.0       | 7.31       | 140.4     | 70.2      | 140.4     | 46.6     |
| 22        | 157.6     | 78.8      | 157.6     | 22.0       | 10.8       | 22.0       | 7.18       | 137.1     | 68.5      | 137.1     | 46.6     |
| 21        | 154.3     | 77.1      | 154.3     | 21.9       | 10.8       | 21.9       | 7.04       | 133.8     | 66.9      | 133.8     | 46.5     |
| 20        | 151.0     | 75.5      | 151.0     | 21.9       | 10.8       | 21.9       | 6.90       | 130.6     | 65.3      | 130.6     | 46.5     |
| 19        | 147.8     | 73.9      | 147.8     | 21.8       | 10.8       | 21.8       | 6.76       | 127.4     | 63.7      | 127.4     | 46.5     |
| 18        | 144.6     | 72.3      | 144.6     | 21.8       | 10.8       | 21.8       | 6.63       | 124.3     | 62.1      | 124.3     | 46.5     |
| 17        | 141.5     | 70.8      | 141.5     | 21.8       | 10.7       | 21.8       | 6.49       | 121.2     | 60.6      | 121.2     | 46.5     |
| 16        | 138.5     | 69.2      | 138.5     | 21.8       | 10.7       | 21.8       | 6.36       | 118.1     | 59.1      | 118.1     | 46.5     |
| 15        | 135.5     | 67.7      | 135.5     | 21.8       | 10.7       | 21.8       | 6.23       | 115.1     | 57.6      | 115.1     | 46.5     |
| 14        | 132.5     | 66.3      | 132.5     | 21.7       | 10.7       | 21.7       | 6.10       | 112.2     | 56.1      | 112.2     | 46.5     |
| 13        | 129.6     | 64.8      | 129.6     | 21.7       | 10.7       | 21.7       | 5.96       | 109.3     | 54.7      | 109.3     | 46.5     |
| 12        | 126.8     | 63.4      | 126.8     | 21.7       | 10.7       | 21.7       | 5.84       | 106.5     | 53.2      | 106.5     | 46.6     |
| 11        | 123.9     | 62.0      | 123.9     | 21.7       | 10.7       | 21.7       | 5.71       | 103.7     | 51.8      | 103.7     | 46.6     |
| 10        | 121.2     | 60.6      | 121.2     | 21.7       | 10.7       | 21.7       | 5.58       | 100.9     | 50.5      | 100.9     | 46.6     |
| 9         | 118.5     | 59.2      | 118.5     | 21.7       | 10.7       | 21.7       | 5.46       | 98.2      | 49.1      | 98.2      | 46.7     |
| 8         | 115.8     | 57.9      | 115.8     | 21.7       | 10.7       | 21.7       | 5.34       | 95.5      | 47.8      | 95.5      | 46.7     |
| 7         | 113.2     | 56.6      | 113.2     | 21.7       | 10.7       | 21.7       | 5.22       | 92.9      | 46.5      | 92.9      | 46.8     |
| 6         | 110.6     | 55.3      | 110.6     | 21.7       | 10.7       | 21.7       | 5.10       | 90.4      | 45.2      | 90.4      | 46.9     |
| 5         | 108.1     | 54.0      | 108.1     | 21.7       | 10.7       | 21.7       | 4.98       | 87.8      | 43.9      | 87.8      | 46.9     |
| 4         | 105.6     | 52.8      | 105.6     | 21.7       | 10.7       | 21.7       | 4.87       | 85.3      | 42.7      | 85.3      | 47.0     |
| 3         | 103.2     | 51.6      | 103.2     | 21.7       | 10.7       | 21.7       | 4.75       | 82.9      | 41.4      | 82.9      | 47.0     |
| 2         | 100.8     | 50.4      | 100.8     | 21.7       | 10.7       | 21.7       | 4.64       | 80.5      | 40.3      | 80.5      | 47.1     |
| 1         | 98.4      | 49.2      | 98.4      | 21.7       | 10.7       | 21.7       | 4.53       | 78.1      | 39.1      | 78.1      | 47.1     |
| 0         | 96.1      | 48.1      | 96.1      | 21.7       | 10.7       | 21.7       | 4.43       | 75.8      | 37.9      | 75.8      | 47.2     |
| -1        | 93.8      | 46.9      | 93.8      | 21.7       | 10.7       | 21.7       | 4.32       | 73.6      | 36.8      | 73.6      | 47.3     |
| -2        | 91.6      | 45.8      | 91.6      | 21.7       | 10.7       | 21.7       | 4.22       | 71.3      | 35.7      | 71.3      | 47.3     |
| -3        | 89.4      | 44.7      | 89.4      | 21.7       | 10.7       | 21.7       | 4.12       | 69.2      | 34.6      | 69.2      | 47.3     |
| -4        | 87.3      | 43.6      | 87.3      | 21.7       | 10.7       | 21.7       | 4.02       | 67.0      | 33.5      | 67.0      | 47.4     |
| -5        | 85.2      | 42.6      | 85.2      | 21.7       | 10.7       | 21.7       | 3.93       | 64.9      | 32.5      | 64.9      | 47.4     |
| -6        | 83.1      | 41.5      | 83.1      | 21.7       | 10.7       | 21.7       | 3.83       | 62.8      | 31.4      | 62.8      | 47.5     |
| -7        | 81.1      | 40.5      | 81.1      | 21.7       | 10.7       | 21.7       | 3.74       | 60.8      | 30.4      | 60.8      | 47.5     |
| -8        | 79.1      | 39.5      | 79.1      | 21.7       | 10.7       | 21.7       | 3.65       | 58.8      | 29.4      | 58.8      | 47.5     |
| -9        | 77.1      | 38.6      | 77.1      | 21.6       | 10.7       | 21.6       | 3.56       | 56.9      | 28.4      | 56.9      | 47.5     |
| -10       | 75.2      | 37.6      | 75.2      | 21.6       | 10.7       | 21.6       | 3.48       | 55.0      | 27.5      | 55.0      | 47.5     |
| -11       | 73.3      | 36.6      | 73.3      | 21.6       | 10.6       | 21.6       | 3.39       | 53.1      | 26.6      | 53.1      | 47.5     |
| -12       | 71.4      | 35.7      | 71.4      | 21.6       | 10.6       | 21.6       | 3.31       | 51.3      | 25.7      | 51.3      | 47.5     |
| -13       | 69.6      | 34.8      | 69.6      | 21.5       | 10.6       | 21.5       | 3.23       | 49.5      | 24.8      | 49.5      | 47.4     |
| -14       | 67.8      | 33.9      | 67.8      | 21.5       | 10.6       | 21.5       | 3.16       | 47.8      | 23.9      | 47.8      | 47.4     |
| -15       | 66.1      | 33.0      | 66.1      | 21.4       | 10.6       | 21.4       | 3.08       | 46.1      | 23.0      | 46.1      | 47.3     |

-- pozor: pracovný rozsah nie je zohľadnený v tabuľke

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| Tv<br>-VY | 45        |           |           |            |            |            |            |           |           |           |          |
|-----------|-----------|-----------|-----------|------------|------------|------------|------------|-----------|-----------|-----------|----------|
| [°C]      | Qh<br>nom | Qh<br>min | Qh<br>max | Pin<br>nom | Pin<br>min | Pin<br>max | COP<br>nom | Qc<br>nom | Qc<br>min | Qc<br>max | I<br>nom |
| [°C]      | [kW]      | [kW]      | [kW]      | [kW]       | [kW]       | [kW]       | kW / kW    | [kW]      | [kW]      | [kW]      | [A]      |
| 25        | 164.6     | 82.3      | 164.6     | 26.6       | 13.1       | 26.6       | 6.18       | 139.7     | 69.9      | 139.7     | 52.9     |
| 24        | 161.4     | 80.7      | 161.4     | 26.6       | 13.1       | 26.6       | 6.06       | 136.5     | 68.2      | 136.5     | 52.8     |
| 23        | 158.2     | 79.1      | 158.2     | 26.6       | 13.1       | 26.6       | 5.94       | 133.3     | 66.7      | 133.3     | 52.8     |
| 22        | 155.0     | 77.5      | 155.0     | 26.6       | 13.1       | 26.6       | 5.82       | 130.2     | 65.1      | 130.2     | 52.7     |
| 21        | 151.9     | 76.0      | 151.9     | 26.6       | 13.1       | 26.6       | 5.71       | 127.1     | 63.5      | 127.1     | 52.7     |
| 20        | 148.9     | 74.4      | 148.9     | 26.6       | 13.1       | 26.6       | 5.59       | 124.0     | 62.0      | 124.0     | 52.7     |
| 19        | 145.9     | 73.0      | 145.9     | 26.6       | 13.1       | 26.6       | 5.48       | 121.0     | 60.5      | 121.0     | 52.7     |
| 18        | 143.0     | 71.5      | 143.0     | 26.6       | 13.1       | 26.6       | 5.37       | 118.1     | 59.0      | 118.1     | 52.7     |
| 17        | 140.0     | 70.0      | 140.0     | 26.6       | 13.1       | 26.6       | 5.26       | 115.2     | 57.6      | 115.2     | 52.7     |
| 16        | 137.2     | 68.6      | 137.2     | 26.6       | 13.1       | 26.6       | 5.15       | 112.3     | 56.2      | 112.3     | 52.7     |
| 15        | 134.4     | 67.2      | 134.4     | 26.7       | 13.1       | 26.7       | 5.04       | 109.5     | 54.7      | 109.5     | 52.7     |
| 14        | 131.6     | 65.8      | 131.6     | 26.7       | 13.2       | 26.7       | 4.94       | 106.7     | 53.4      | 106.7     | 52.7     |
| 13        | 128.9     | 64.4      | 128.9     | 26.7       | 13.2       | 26.7       | 4.83       | 104.0     | 52.0      | 104.0     | 52.7     |
| 12        | 126.2     | 63.1      | 126.2     | 26.7       | 13.2       | 26.7       | 4.73       | 101.3     | 50.6      | 101.3     | 52.8     |
| 11        | 123.6     | 61.8      | 123.6     | 26.7       | 13.2       | 26.7       | 4.63       | 98.6      | 49.3      | 98.6      | 52.8     |
| 10        | 121.0     | 60.5      | 121.0     | 26.7       | 13.2       | 26.7       | 4.53       | 96.0      | 48.0      | 96.0      | 52.8     |
| 9         | 118.4     | 59.2      | 118.4     | 26.7       | 13.2       | 26.7       | 4.43       | 93.4      | 46.7      | 93.4      | 52.8     |
| 8         | 115.9     | 57.9      | 115.9     | 26.7       | 13.2       | 26.7       | 4.33       | 90.9      | 45.4      | 90.9      | 52.8     |
| 7         | 113.4     | 56.7      | 113.4     | 26.8       | 13.2       | 26.8       | 4.24       | 88.4      | 44.2      | 88.4      | 52.9     |
| 6         | 111.0     | 55.5      | 111.0     | 26.8       | 13.2       | 26.8       | 4.14       | 86.0      | 43.0      | 86.0      | 52.9     |
| 5         | 108.6     | 54.3      | 108.6     | 26.8       | 13.2       | 26.8       | 4.05       | 83.5      | 41.8      | 83.5      | 52.9     |
| 4         | 106.2     | 53.1      | 106.2     | 26.8       | 13.2       | 26.8       | 3.96       | 81.2      | 40.6      | 81.2      | 52.9     |
| 3         | 103.9     | 51.9      | 103.9     | 26.8       | 13.2       | 26.8       | 3.88       | 78.8      | 39.4      | 78.8      | 52.9     |
| 2         | 101.6     | 50.8      | 101.6     | 26.8       | 13.2       | 26.8       | 3.79       | 76.6      | 38.3      | 76.6      | 53.0     |
| 1         | 99.3      | 49.7      | 99.3      | 26.8       | 13.2       | 26.8       | 3.71       | 74.3      | 37.2      | 74.3      | 53.0     |
| 0         | 97.1      | 48.6      | 97.1      | 26.8       | 13.2       | 26.8       | 3.62       | 72.1      | 36.0      | 72.1      | 53.0     |
| -1        | 94.9      | 47.5      | 94.9      | 26.8       | 13.2       | 26.8       | 3.54       | 69.9      | 35.0      | 69.9      | 53.0     |
| -2        | 92.8      | 46.4      | 92.8      | 26.8       | 13.2       | 26.8       | 3.46       | 67.8      | 33.9      | 67.8      | 52.9     |
| -3        | 90.7      | 45.3      | 90.7      | 26.8       | 13.2       | 26.8       | 3.39       | 65.7      | 32.8      | 65.7      | 52.9     |
| -4        | 88.6      | 44.3      | 88.6      | 26.8       | 13.2       | 26.8       | 3.31       | 63.6      | 31.8      | 63.6      | 52.9     |
| -5        | 86.6      | 43.3      | 86.6      | 26.8       | 13.2       | 26.8       | 3.24       | 61.6      | 30.8      | 61.6      | 52.9     |
| -6        | 84.6      | 42.3      | 84.6      | 26.7       | 13.2       | 26.7       | 3.16       | 59.6      | 29.8      | 59.6      | 52.8     |
| -7        | 82.6      | 41.3      | 82.6      | 26.7       | 13.2       | 26.7       | 3.09       | 57.6      | 28.8      | 57.6      | 52.8     |
| -8        | 80.6      | 40.3      | 80.6      | 26.7       | 13.2       | 26.7       | 3.02       | 55.7      | 27.9      | 55.7      | 52.7     |
| -9        | 78.7      | 39.4      | 78.7      | 26.6       | 13.1       | 26.6       | 2.96       | 53.8      | 26.9      | 53.8      | 52.6     |
| -10       | 76.8      | 38.4      | 76.8      | 26.6       | 13.1       | 26.6       | 2.89       | 52.0      | 26.0      | 52.0      | 52.5     |
| -11       | 75.0      | 37.5      | 75.0      | 26.5       | 13.1       | 26.5       | 2.82       | 50.2      | 25.1      | 50.2      | 52.4     |
| -12       | 73.2      | 36.6      | 73.2      | 26.5       | 13.1       | 26.5       | 2.76       | 48.4      | 24.2      | 48.4      | 52.3     |
| -13       | 71.4      | 35.7      | 71.4      | 26.4       | 13.0       | 26.4       | 2.70       | 46.7      | 23.3      | 46.7      | 52.2     |
| -14       | 69.6      | 34.8      | 69.6      | 26.4       | 13.0       | 26.4       | 2.64       | 45.0      | 22.5      | 45.0      | 52.0     |
| -15       | 67.9      | 33.9      | 67.9      | 26.3       | 13.0       | 26.3       | 2.58       | 43.3      | 21.6      | 43.3      | 51.9     |

-- pozor: pracovný rozsah nie je zohľadnený v tabuľke

| Tv<br>-VY | 55        |           |           |            |            |            |            |           |           |           |          |
|-----------|-----------|-----------|-----------|------------|------------|------------|------------|-----------|-----------|-----------|----------|
| Tz<br>-VS | Qh<br>nom | Qh<br>min | Qh<br>max | Pin<br>nom | Pin<br>min | Pin<br>max | COP<br>nom | Qc<br>nom | Qc<br>min | Qc<br>max | I<br>nom |
| [°C]      | [kW]      | [kW]      | [kW]      | [kW]       | [kW]       | [kW]       | kW / kW    | [kW]      | [kW]      | [kW]      | [A]      |
| 25        | 161.5     | 80.8      | 161.5     | 33.7       | 16.6       | 33.7       | 4.79       | 130.0     | 65.0      | 130.0     | 61.3     |
| 24        | 158.5     | 79.3      | 158.5     | 33.7       | 16.6       | 33.7       | 4.70       | 127.0     | 63.5      | 127.0     | 61.3     |
| 23        | 155.6     | 77.8      | 155.6     | 33.7       | 16.6       | 33.7       | 4.61       | 124.1     | 62.0      | 124.1     | 61.3     |
| 22        | 152.7     | 76.3      | 152.7     | 33.8       | 16.6       | 33.8       | 4.52       | 121.2     | 60.6      | 121.2     | 61.3     |
| 21        | 149.8     | 74.9      | 149.8     | 33.8       | 16.7       | 33.8       | 4.44       | 118.3     | 59.1      | 118.3     | 61.3     |
| 20        | 147.0     | 73.5      | 147.0     | 33.8       | 16.7       | 33.8       | 4.35       | 115.4     | 57.7      | 115.4     | 61.3     |
| 19        | 144.2     | 72.1      | 144.2     | 33.8       | 16.7       | 33.8       | 4.26       | 112.6     | 56.3      | 112.6     | 61.3     |
| 18        | 141.5     | 70.7      | 141.5     | 33.9       | 16.7       | 33.9       | 4.18       | 109.9     | 54.9      | 109.9     | 61.3     |
| 17        | 138.8     | 69.4      | 138.8     | 33.9       | 16.7       | 33.9       | 4.10       | 107.1     | 53.6      | 107.1     | 61.4     |
| 16        | 136.1     | 68.1      | 136.1     | 33.9       | 16.7       | 33.9       | 4.01       | 104.4     | 52.2      | 104.4     | 61.4     |
| 15        | 133.5     | 66.7      | 133.5     | 33.9       | 16.7       | 33.9       | 3.93       | 101.8     | 50.9      | 101.8     | 61.4     |
| 14        | 130.9     | 65.4      | 130.9     | 34.0       | 16.7       | 34.0       | 3.86       | 99.2      | 49.6      | 99.2      | 61.4     |
| 13        | 128.3     | 64.2      | 128.3     | 34.0       | 16.8       | 34.0       | 3.78       | 96.6      | 48.3      | 96.6      | 61.5     |
| 12        | 125.8     | 62.9      | 125.8     | 34.0       | 16.8       | 34.0       | 3.70       | 94.1      | 47.0      | 94.1      | 61.5     |
| 11        | 123.4     | 61.7      | 123.4     | 34.0       | 16.8       | 34.0       | 3.63       | 91.6      | 45.8      | 91.6      | 61.5     |
| 10        | 120.9     | 60.5      | 120.9     | 34.0       | 16.8       | 34.0       | 3.55       | 89.1      | 44.6      | 89.1      | 61.5     |
| 9         | 118.5     | 59.3      | 118.5     | 34.0       | 16.8       | 34.0       | 3.48       | 86.7      | 43.4      | 86.7      | 61.5     |
| 8         | 116.1     | 58.1      | 116.1     | 34.1       | 16.8       | 34.1       | 3.41       | 84.3      | 42.2      | 84.3      | 61.5     |
| 7         | 113.8     | 56.9      | 113.8     | 34.1       | 16.8       | 34.1       | 3.34       | 82.0      | 41.0      | 82.0      | 61.5     |
| 6         | 111.5     | 55.7      | 111.5     | 34.1       | 16.8       | 34.1       | 3.27       | 79.7      | 39.8      | 79.7      | 61.5     |
| 5         | 109.2     | 54.6      | 109.2     | 34.1       | 16.8       | 34.1       | 3.20       | 77.4      | 38.7      | 77.4      | 61.5     |
| 4         | 107.0     | 53.5      | 107.0     | 34.1       | 16.8       | 34.1       | 3.14       | 75.1      | 37.6      | 75.1      | 61.5     |
| 3         | 104.7     | 52.4      | 104.7     | 34.1       | 16.8       | 34.1       | 3.07       | 72.9      | 36.5      | 72.9      | 61.5     |
| 2         | 102.6     | 51.3      | 102.6     | 34.1       | 16.8       | 34.1       | 3.01       | 70.8      | 35.4      | 70.8      | 61.5     |
| 1         | 100.4     | 50.2      | 100.4     | 34.0       | 16.8       | 34.0       | 2.95       | 68.6      | 34.3      | 68.6      | 61.4     |
| 0         | 98.3      | 49.1      | 98.3      | 34.0       | 16.8       | 34.0       | 2.89       | 66.5      | 33.3      | 66.5      | 61.4     |
| -1        | 96.2      | 48.1      | 96.2      | 34.0       | 16.8       | 34.0       | 2.83       | 64.4      | 32.2      | 64.4      | 61.3     |
| -2        | 94.1      | 47.1      | 94.1      | 34.0       | 16.8       | 34.0       | 2.77       | 62.4      | 31.2      | 62.4      | 61.3     |
| -3        | 92.1      | 46.0      | 92.1      | 33.9       | 16.7       | 33.9       | 2.71       | 60.4      | 30.2      | 60.4      | 61.2     |
| -4        | 90.1      | 45.0      | 90.1      | 33.9       | 16.7       | 33.9       | 2.66       | 58.4      | 29.2      | 58.4      | 61.1     |
| -5        | 88.1      | 44.0      | 88.1      | 33.9       | 16.7       | 33.9       | 2.60       | 56.5      | 28.2      | 56.5      | 61.0     |
| -6        | 86.1      | 43.1      | 86.1      | 33.8       | 16.7       | 33.8       | 2.55       | 54.6      | 27.3      | 54.6      | 60.9     |
| -7        | 84.2      | 42.1      | 84.2      | 33.7       | 16.6       | 33.7       | 2.50       | 52.7      | 26.3      | 52.7      | 60.8     |
| -8        | 82.3      | 41.1      | 82.3      | 33.7       | 16.6       | 33.7       | 2.44       | 50.8      | 25.4      | 50.8      | 60.6     |
| -9        | 80.4      | 40.2      | 80.4      | 33.6       | 16.6       | 33.6       | 2.39       | 49.0      | 24.5      | 49.0      | 60.5     |
| -10       | 78.5      | 39.3      | 78.5      | 33.5       | 16.5       | 33.5       | 2.34       | 47.2      | 23.6      | 47.2      | 60.3     |
| -11       | 76.7      | 38.3      | 76.7      | 33.4       | 16.5       | 33.4       | 2.29       | 45.5      | 22.7      | 45.5      | 60.1     |
| -12       | 74.9      | 37.4      | 74.9      | 33.3       | 16.4       | 33.3       | 2.25       | 43.7      | 21.9      | 43.7      | 59.9     |
| -13       | 73.1      | 36.5      | 73.1      | 33.2       | 16.4       | 33.2       | 2.20       | 42.1      | 21.0      | 42.1      | 59.7     |
| -14       | 71.3      | 35.7      | 71.3      | 33.1       | 16.3       | 33.1       | 2.15       | 40.4      | 20.2      | 40.4      | 59.4     |
| -15       | 69.6      | 34.8      | 69.6      | 33.0       | 16.3       | 33.0       | 2.11       | 38.7      | 19.4      | 38.7      | 59.2     |

-- pozor: pracovný rozsah nie je zohľadnený v tabuľke

| Tv<br>-VY | [°C]      | 65 (T-max) |           |            |            |            |            |           |           |           |          |
|-----------|-----------|------------|-----------|------------|------------|------------|------------|-----------|-----------|-----------|----------|
| Tz<br>-VS | Qh<br>nom | Qh<br>min  | Qh<br>max | Pin<br>nom | Pin<br>min | Pin<br>max | COP<br>nom | Qc<br>nom | Qc<br>min | Qc<br>max | I<br>nom |
| [°C]      | [kW]      | [kW]       | [kW]      | [kW]       | [kW]       | [kW]       | kW / kW    | [kW]      | [kW]      | [kW]      | [A]      |
| 25        | 159.4     | 79.7       | 159.4     | 42.9       | 21.2       | 42.9       | 3.71       | 119.3     | 59.7      | 119.3     | 72.0     |
| 24        | 156.6     | 78.3       | 156.6     | 43.0       | 21.2       | 43.0       | 3.65       | 116.5     | 58.3      | 116.5     | 72.0     |
| 23        | 153.9     | 77.0       | 153.9     | 43.0       | 21.2       | 43.0       | 3.58       | 113.8     | 56.9      | 113.8     | 72.1     |
| 22        | 151.2     | 75.6       | 151.2     | 43.0       | 21.2       | 43.0       | 3.51       | 111.0     | 55.5      | 111.0     | 72.2     |
| 21        | 148.6     | 74.3       | 148.6     | 43.1       | 21.2       | 43.1       | 3.45       | 108.3     | 54.2      | 108.3     | 72.2     |
| 20        | 145.9     | 73.0       | 145.9     | 43.1       | 21.3       | 43.1       | 3.39       | 105.7     | 52.8      | 105.7     | 72.3     |
| 19        | 143.3     | 71.7       | 143.3     | 43.1       | 21.3       | 43.1       | 3.32       | 103.1     | 51.5      | 103.1     | 72.3     |
| 18        | 140.8     | 70.4       | 140.8     | 43.2       | 21.3       | 43.2       | 3.26       | 100.5     | 50.2      | 100.5     | 72.4     |
| 17        | 138.3     | 69.1       | 138.3     | 43.2       | 21.3       | 43.2       | 3.20       | 97.9      | 49.0      | 97.9      | 72.4     |
| 16        | 135.8     | 67.9       | 135.8     | 43.2       | 21.3       | 43.2       | 3.14       | 95.4      | 47.7      | 95.4      | 72.5     |
| 15        | 133.3     | 66.7       | 133.3     | 43.2       | 21.3       | 43.2       | 3.08       | 92.9      | 46.5      | 92.9      | 72.6     |
| 14        | 130.9     | 65.4       | 130.9     | 43.2       | 21.3       | 43.2       | 3.03       | 90.5      | 45.3      | 90.5      | 72.6     |
| 13        | 128.5     | 64.2       | 128.5     | 43.3       | 21.3       | 43.3       | 2.97       | 88.1      | 44.0      | 88.1      | 72.6     |
| 12        | 126.1     | 63.1       | 126.1     | 43.3       | 21.3       | 43.3       | 2.92       | 85.7      | 42.9      | 85.7      | 72.7     |
| 11        | 123.8     | 61.9       | 123.8     | 43.3       | 21.3       | 43.3       | 2.86       | 83.4      | 41.7      | 83.4      | 72.7     |
| 10        | 121.5     | 60.7       | 121.5     | 43.3       | 21.3       | 43.3       | 2.81       | 81.0      | 40.5      | 81.0      | 72.7     |
| 9         | 119.2     | 59.6       | 119.2     | 43.3       | 21.3       | 43.3       | 2.75       | 78.8      | 39.4      | 78.8      | 72.8     |
| 8         | 116.9     | 58.5       | 116.9     | 43.3       | 21.3       | 43.3       | 2.70       | 76.5      | 38.3      | 76.5      | 72.8     |
| 7         | 114.7     | 57.3       | 114.7     | 43.2       | 21.3       | 43.2       | 2.65       | 74.3      | 37.1      | 74.3      | 72.8     |
| 6         | 112.5     | 56.2       | 112.5     | 43.2       | 21.3       | 43.2       | 2.60       | 72.1      | 36.1      | 72.1      | 72.8     |
| 5         | 110.3     | 55.2       | 110.3     | 43.2       | 21.3       | 43.2       | 2.55       | 70.0      | 35.0      | 70.0      | 72.8     |
| 4         | 108.1     | 54.1       | 108.1     | 43.2       | 21.3       | 43.2       | 2.50       | 67.8      | 33.9      | 67.8      | 72.7     |
| 3         | 106.0     | 53.0       | 106.0     | 43.1       | 21.3       | 43.1       | 2.46       | 65.7      | 32.9      | 65.7      | 72.7     |
| 2         | 103.9     | 52.0       | 103.9     | 43.1       | 21.3       | 43.1       | 2.41       | 63.7      | 31.8      | 63.7      | 72.6     |
| 1         | 101.8     | 50.9       | 101.8     | 43.1       | 21.2       | 43.1       | 2.37       | 61.6      | 30.8      | 61.6      | 72.6     |
| 0         | 99.8      | 49.9       | 99.8      | 43.0       | 21.2       | 43.0       | 2.32       | 59.6      | 29.8      | 59.6      | 72.5     |
| -1        | 97.7      | 48.9       | 97.7      | 42.9       | 21.2       | 42.9       | 2.28       | 57.6      | 28.8      | 57.6      | 72.4     |
| -2        | 95.7      | 47.9       | 95.7      | 42.9       | 21.1       | 42.9       | 2.23       | 55.7      | 27.8      | 55.7      | 72.3     |
| -3        | 93.7      | 46.9       | 93.7      | 42.8       | 21.1       | 42.8       | 2.19       | 53.8      | 26.9      | 53.8      | 72.2     |
| -4        | 91.8      | 45.9       | 91.8      | 42.7       | 21.1       | 42.7       | 2.15       | 51.9      | 25.9      | 51.9      | 72.1     |
| -5        | 89.8      | 44.9       | 89.8      | 42.6       | 21.0       | 42.6       | 2.11       | 50.0      | 25.0      | 50.0      | 71.9     |
| -6        | 87.9      | 43.9       | 87.9      | 42.5       | 21.0       | 42.5       | 2.07       | 48.2      | 24.1      | 48.2      | 71.8     |
| -7        | 86.0      | 43.0       | 86.0      | 42.4       | 20.9       | 42.4       | 2.03       | 46.4      | 23.2      | 46.4      | 71.6     |
| -8        | 84.1      | 42.0       | 84.1      | 42.3       | 20.9       | 42.3       | 1.99       | 44.6      | 22.3      | 44.6      | 71.4     |
| -9        | 82.2      | 41.1       | 82.2      | 42.2       | 20.8       | 42.2       | 1.95       | 42.8      | 21.4      | 42.8      | 71.2     |
| -10       | 80.4      | 40.2       | 80.4      | 42.0       | 20.7       | 42.0       | 1.91       | 41.1      | 20.5      | 41.1      | 70.9     |
| -11       | 78.5      | 39.3       | 78.5      | 41.9       | 20.7       | 41.9       | 1.87       | 39.4      | 19.7      | 39.4      | 70.6     |
| -12       | 76.7      | 38.3       | 76.7      | 41.7       | 20.6       | 41.7       | 1.84       | 37.7      | 18.9      | 37.7      | 70.4     |
| -13       | 74.9      | 37.4       | 74.9      | 41.6       | 20.5       | 41.6       | 1.80       | 36.1      | 18.0      | 36.1      | 70.1     |
| -14       | 73.1      | 36.5       | 73.1      | 41.4       | 20.4       | 41.4       | 1.77       | 34.4      | 17.2      | 34.4      | 69.7     |
| -15       | 71.3      | 35.6       | 71.3      | 41.2       | 20.3       | 41.2       | 1.73       | 32.8      | 16.4      | 32.8      | 69.4     |

-- pozor: pracovný rozsah nie je zohľadnený v tabuľke

| Tch<br>-VY |             | W 12 / 7 °C |           |             |            |            |             |           |           |           |          |
|------------|-------------|-------------|-----------|-------------|------------|------------|-------------|-----------|-----------|-----------|----------|
| Tz<br>-VS  | Qc<br>nom   | Qc<br>min   | Qc<br>max | Pin<br>nom  | Pin<br>min | Pin<br>max | EER         | Qh<br>nom | Qh<br>min | Qh<br>max | I<br>nom |
| [°C]       | [kW]        | [kW]        | [kW]      | [kW]        | [kW]       | [kW]       | kW / kW     | [kW]      | [kW]      | [kW]      | [A]      |
| 40         | <b>70.4</b> | 35.2        | 70.4      | <b>29.0</b> | 14.3       | 29.0       | <b>2.43</b> | 97.5      | 48.7      | 97.5      | 55.5     |
| 39         | <b>70.9</b> | 35.5        | 70.9      | <b>28.4</b> | 14.0       | 28.4       | <b>2.50</b> | 97.4      | 48.7      | 97.4      | 54.7     |
| 38         | <b>71.4</b> | 35.7        | 71.4      | <b>27.7</b> | 13.7       | 27.7       | <b>2.58</b> | 97.3      | 48.6      | 97.3      | 54.0     |
| 37         | <b>71.9</b> | 35.9        | 71.9      | <b>27.1</b> | 13.4       | 27.1       | <b>2.65</b> | 97.2      | 48.6      | 97.2      | 53.3     |
| 36         | <b>72.3</b> | 36.2        | 72.3      | <b>26.5</b> | 13.1       | 26.5       | <b>2.73</b> | 97.1      | 48.5      | 97.1      | 52.6     |
| 35         | <b>72.8</b> | 36.4        | 72.8      | <b>25.9</b> | 12.8       | 25.9       | <b>2.81</b> | 97.0      | 48.5      | 97.0      | 52.0     |
| 34         | <b>73.2</b> | 36.6        | 73.2      | <b>25.4</b> | 12.5       | 25.4       | <b>2.89</b> | 96.9      | 48.4      | 96.9      | 51.3     |
| 33         | <b>73.6</b> | 36.8        | 73.6      | <b>24.8</b> | 12.2       | 24.8       | <b>2.97</b> | 96.8      | 48.4      | 96.8      | 50.7     |
| 32         | <b>74.0</b> | 37.0        | 74.0      | <b>24.3</b> | 12.0       | 24.3       | <b>3.05</b> | 96.7      | 48.3      | 96.7      | 50.1     |
| 31         | <b>74.4</b> | 37.2        | 74.4      | <b>23.7</b> | 11.7       | 23.7       | <b>3.14</b> | 96.6      | 48.3      | 96.6      | 49.5     |
| 30         | <b>74.8</b> | 37.4        | 74.8      | <b>23.2</b> | 11.4       | 23.2       | <b>3.22</b> | 96.4      | 48.2      | 96.4      | 48.9     |
| 29         | <b>75.1</b> | 37.6        | 75.1      | <b>22.7</b> | 11.2       | 22.7       | <b>3.31</b> | 96.3      | 48.2      | 96.3      | 48.3     |
| 28         | <b>75.5</b> | 37.7        | 75.5      | <b>22.2</b> | 10.9       | 22.2       | <b>3.40</b> | 96.2      | 48.1      | 96.2      | 47.7     |
| 27         | <b>75.8</b> | 37.9        | 75.8      | <b>21.7</b> | 10.7       | 21.7       | <b>3.49</b> | 96.1      | 48.1      | 96.1      | 47.2     |
| 26         | <b>76.2</b> | 38.1        | 76.2      | <b>21.2</b> | 10.5       | 21.2       | <b>3.59</b> | 96.0      | 48.0      | 96.0      | 46.7     |
| 25         | <b>76.5</b> | 38.2        | 76.5      | <b>20.8</b> | 10.2       | 20.8       | <b>3.68</b> | 95.9      | 47.9      | 95.9      | 46.1     |
| 24         | <b>76.8</b> | 38.4        | 76.8      | <b>20.3</b> | 10.0       | 20.3       | <b>3.78</b> | 95.7      | 47.9      | 95.7      | 45.6     |
| 23         | <b>77.1</b> | 38.5        | 77.1      | <b>19.9</b> | 9.8        | 19.9       | <b>3.88</b> | 95.6      | 47.8      | 95.6      | 45.1     |
| 22         | <b>77.3</b> | 38.7        | 77.3      | <b>19.4</b> | 9.6        | 19.4       | <b>3.98</b> | 95.5      | 47.7      | 95.5      | 44.6     |
| 21         | <b>77.6</b> | 38.8        | 77.6      | <b>19.0</b> | 9.4        | 19.0       | <b>4.09</b> | 95.3      | 47.7      | 95.3      | 44.1     |
| 20         | <b>77.9</b> | 38.9        | 77.9      | <b>18.6</b> | 9.1        | 18.6       | <b>4.20</b> | 95.2      | 47.6      | 95.2      | 43.6     |

| Tc [°C] |              | W 23 / 18 °C |           |             |            |            |             |           |           |           |          |
|---------|--------------|--------------|-----------|-------------|------------|------------|-------------|-----------|-----------|-----------|----------|
| 0       | Qc<br>nom    | Qc<br>min    | Qc<br>max | Pin<br>nom  | Pin<br>min | Pin<br>max | EER         | Qh<br>nom | Qh<br>min | Qh<br>max | I<br>nom |
| [°C]    | [kW]         | [kW]         | [kW]      | [kW]        | [kW]       | [kW]       | kW / kW     | [kW]      | [kW]      | [kW]      | [A]      |
| 40      | <b>93.9</b>  | 46.9         | 93.9      | <b>29.0</b> | 14.3       | 29.0       | <b>3.24</b> | 120.9     | 60.4      | 121.0     | 55.4     |
| 39      | <b>94.5</b>  | 47.3         | 94.5      | <b>28.4</b> | 14.0       | 28.4       | <b>3.33</b> | 120.9     | 60.5      | 121.0     | 54.7     |
| 38      | <b>95.1</b>  | 47.6         | 95.1      | <b>27.7</b> | 13.7       | 27.7       | <b>3.43</b> | 120.9     | 60.5      | 120.9     | 53.9     |
| 37      | <b>95.7</b>  | 47.9         | 95.7      | <b>27.1</b> | 13.4       | 27.1       | <b>3.53</b> | 120.9     | 60.5      | 120.9     | 53.2     |
| 36      | <b>96.3</b>  | 48.1         | 96.3      | <b>26.5</b> | 13.1       | 26.5       | <b>3.63</b> | 121.0     | 60.5      | 120.9     | 52.4     |
| 35      | <b>96.9</b>  | 48.4         | 96.9      | <b>25.9</b> | 12.8       | 25.9       | <b>3.74</b> | 121.0     | 60.5      | 120.9     | 51.7     |
| 34      | <b>97.4</b>  | 48.7         | 97.4      | <b>25.4</b> | 12.5       | 25.4       | <b>3.84</b> | 121.0     | 60.5      | 120.9     | 51.1     |
| 33      | <b>97.9</b>  | 49.0         | 97.9      | <b>24.8</b> | 12.2       | 24.8       | <b>3.95</b> | 121.0     | 60.5      | 120.9     | 50.4     |
| 32      | <b>98.5</b>  | 49.2         | 98.5      | <b>24.3</b> | 12.0       | 24.3       | <b>4.06</b> | 121.1     | 60.5      | 120.9     | 49.7     |
| 31      | <b>99.0</b>  | 49.5         | 99.0      | <b>23.7</b> | 11.7       | 23.7       | <b>4.17</b> | 121.1     | 60.5      | 120.9     | 49.1     |
| 30      | <b>99.5</b>  | 49.7         | 99.5      | <b>23.2</b> | 11.4       | 23.2       | <b>4.29</b> | 121.1     | 60.6      | 120.9     | 48.5     |
| 29      | <b>100.0</b> | 50.0         | 100.0     | <b>22.7</b> | 11.2       | 22.7       | <b>4.41</b> | 121.1     | 60.6      | 120.9     | 47.9     |
| 28      | <b>100.5</b> | 50.2         | 100.5     | <b>22.2</b> | 10.9       | 22.2       | <b>4.53</b> | 121.2     | 60.6      | 120.9     | 47.2     |
| 27      | <b>100.9</b> | 50.5         | 100.9     | <b>21.7</b> | 10.7       | 21.7       | <b>4.65</b> | 121.2     | 60.6      | 120.9     | 46.6     |
| 26      | <b>101.4</b> | 50.7         | 101.4     | <b>21.2</b> | 10.5       | 21.2       | <b>4.77</b> | 121.2     | 60.6      | 121.0     | 46.1     |
| 25      | <b>101.8</b> | 50.9         | 101.8     | <b>20.8</b> | 10.2       | 20.8       | <b>4.90</b> | 121.2     | 60.6      | 121.0     | 45.5     |
| 24      | <b>102.2</b> | 51.1         | 102.2     | <b>20.3</b> | 10.0       | 20.3       | <b>5.03</b> | 121.3     | 60.6      | 121.0     | 44.9     |
| 23      | <b>102.7</b> | 51.3         | 102.7     | <b>19.9</b> | 9.8        | 19.9       | <b>5.17</b> | 121.3     | 60.6      | 121.0     | 44.3     |
| 22      | <b>103.1</b> | 51.5         | 103.1     | <b>19.4</b> | 9.6        | 19.4       | <b>5.31</b> | 121.3     | 60.6      | 121.1     | 43.8     |
| 21      | <b>103.4</b> | 51.7         | 103.4     | <b>19.0</b> | 9.4        | 19.0       | <b>5.45</b> | 121.3     | 60.6      | 121.1     | 43.2     |
| 20      | <b>103.8</b> | 51.9         | 103.8     | <b>18.6</b> | 9.1        | 18.6       | <b>5.60</b> | 121.3     | 60.6      | 121.1     | 42.6     |

-- pozor: pracovný rozsah nie je zohľadnený v tabuľke

### LEGENDA:

Tz-VS: Teplota zdroja - vstup [°C]

Tv-VY: Teplota vykurovania - výstup [°C]

Tch-VY: Teplota chladenia - výstup [°C]

Qh nom: Nominálny tepelný výkon

Qh min: Minimálny tepelný výkon

Qh max: Maximálny tepelný výkon

Pin nom: Príkon pri nominálnom tepelnom výkone

Pin min: Príkon pri minimálnom tepelnom výkone

Pin max: Príkon pri maximálnom tepelnom výkone

COP nom: Koeficient účinnosti pri nominálnom tepelnom výkone

Qc nom: Chladiaci výkon / odobrané teplo pri nominálnom tepelnom výkone

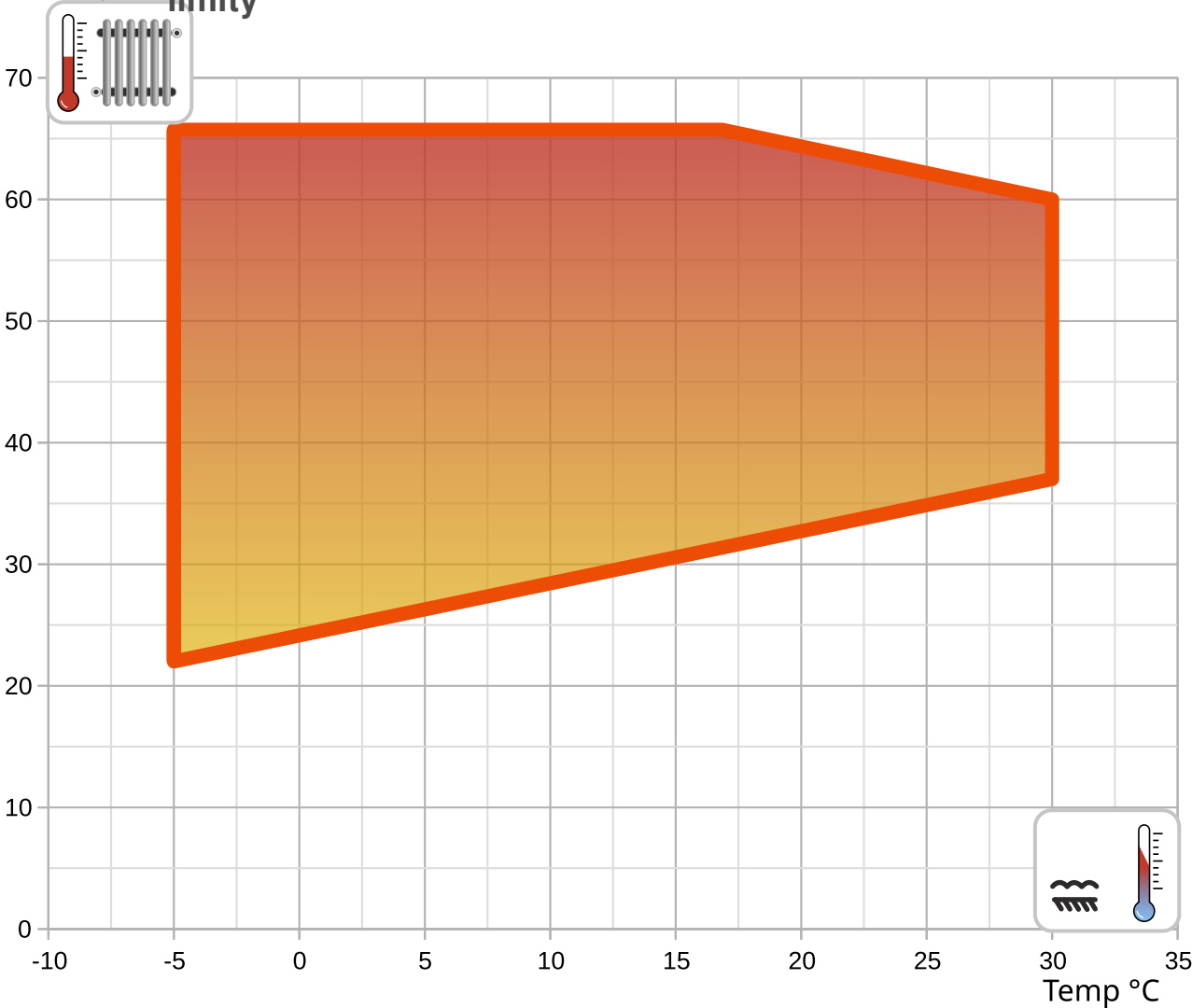
Qc min: Chladiaci výkon / odobrané teplo pri minimálnom tepelnom výkone

Qc max: Chladiaci výkon / odobrané teplo pri maximálnom tepelnom výkone

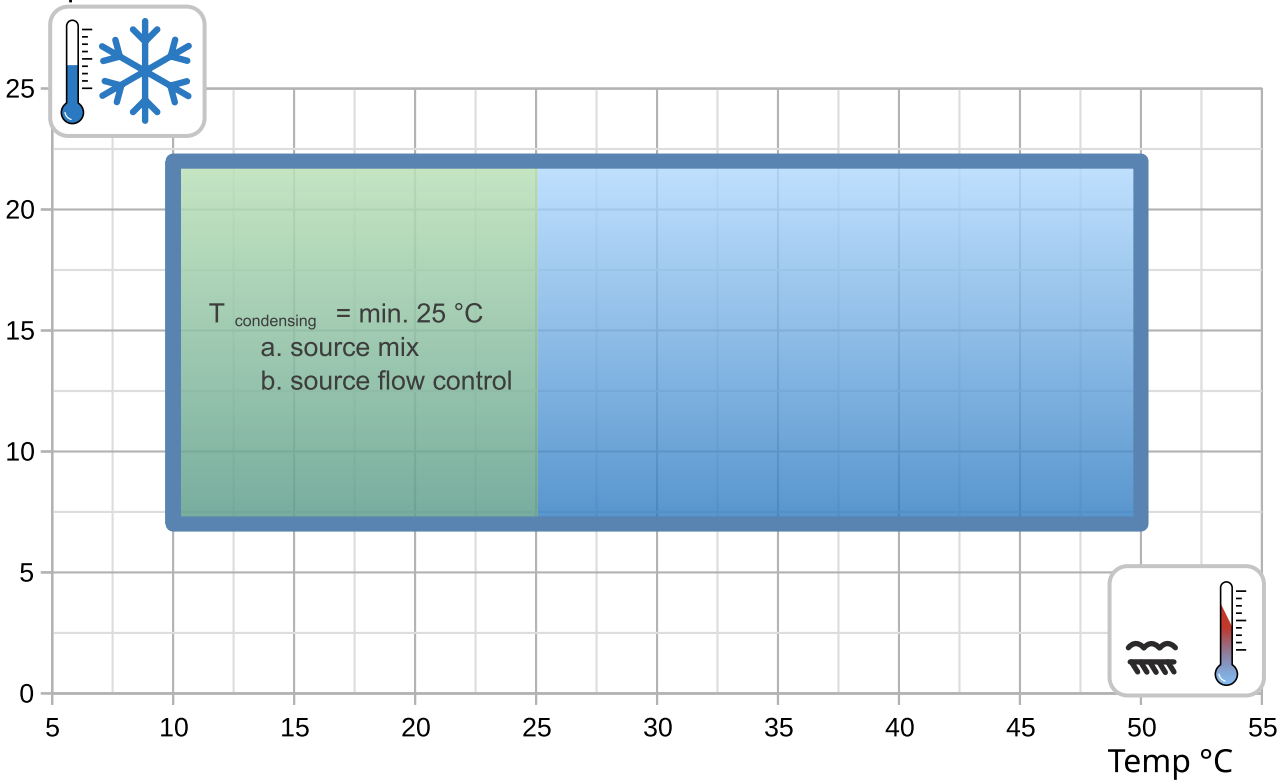
I nom: Prúd pri nominálnom tepelnom výkone

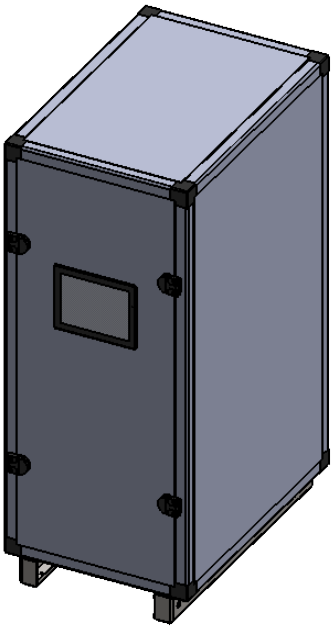
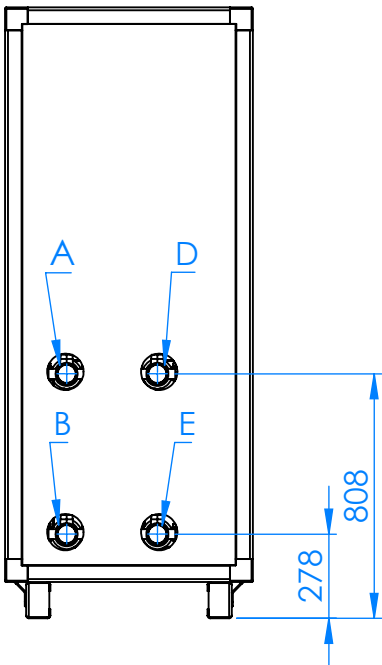
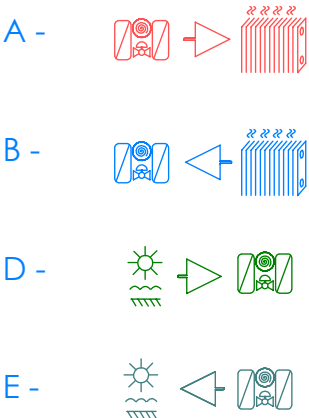
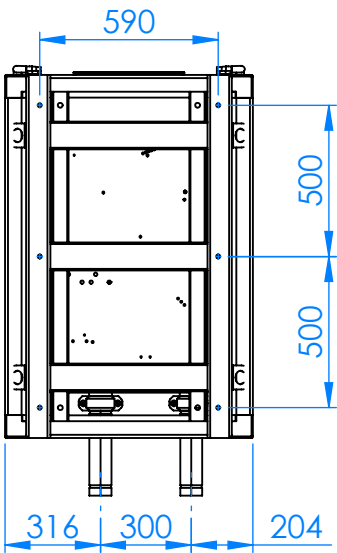
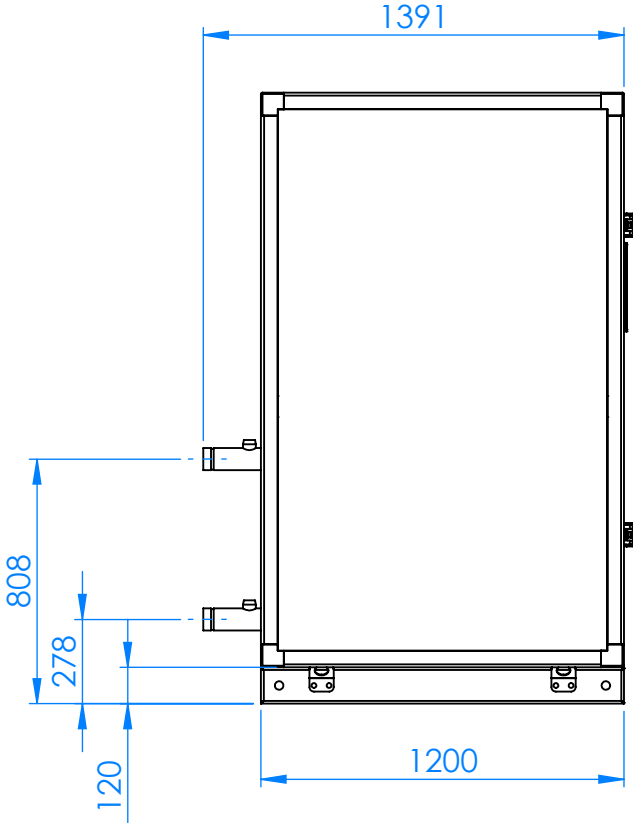
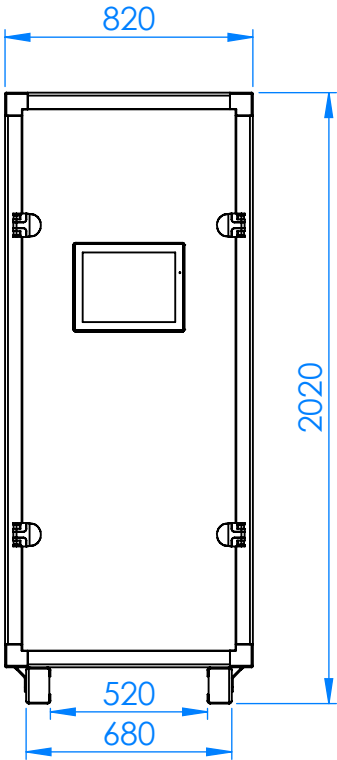
EER: Koeficient účinnosti pri nominálnom chladiacom výkone

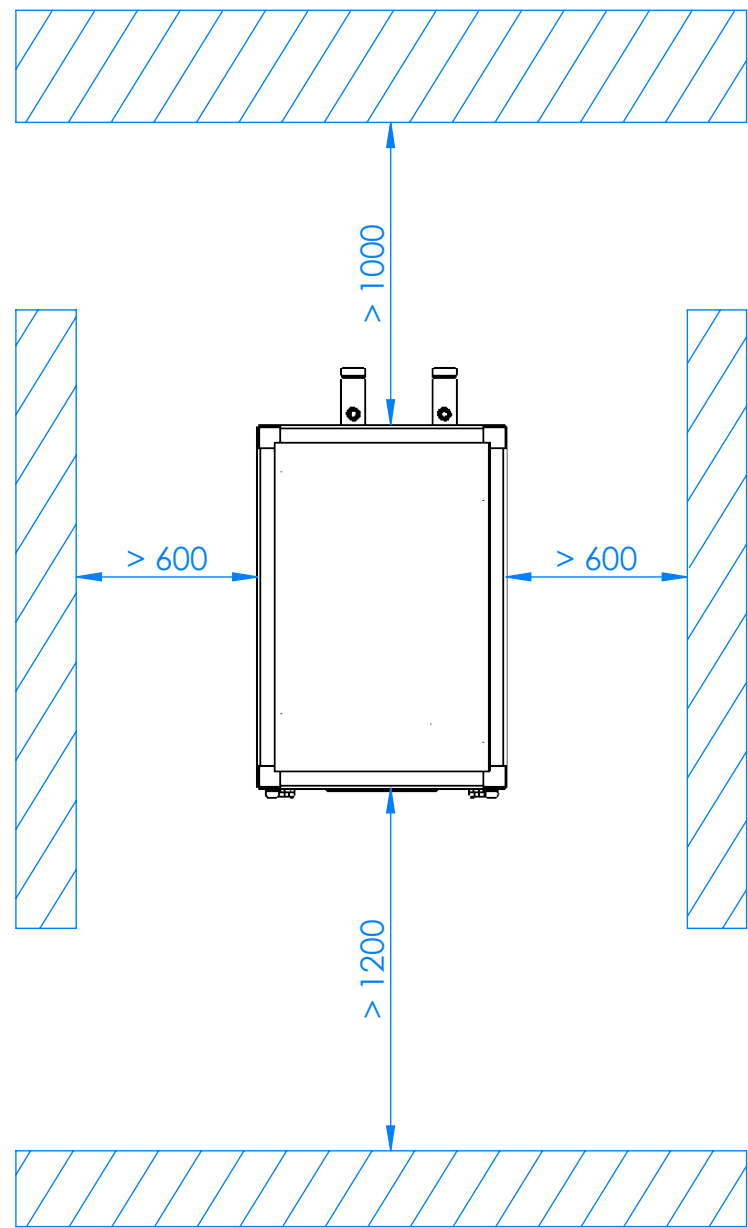
Prevádzkové  
Temp °C  
limity

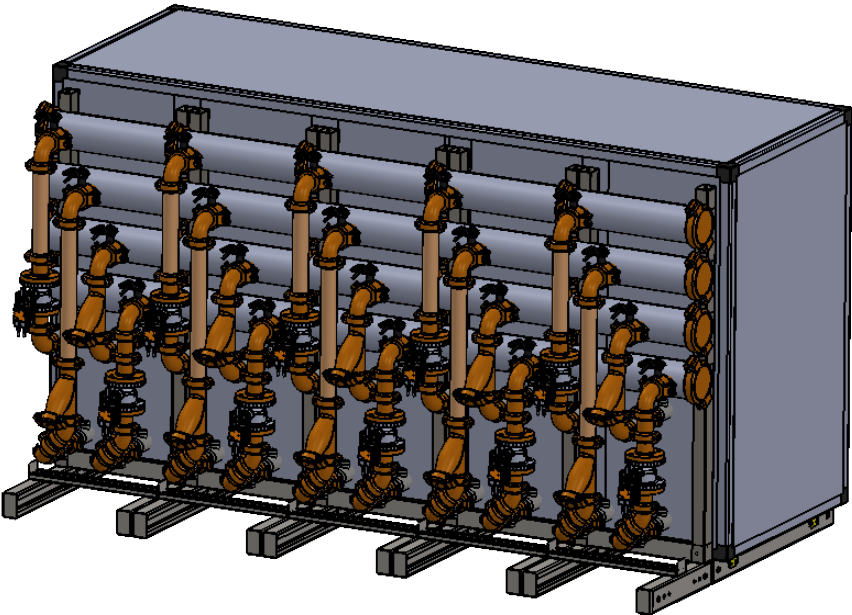
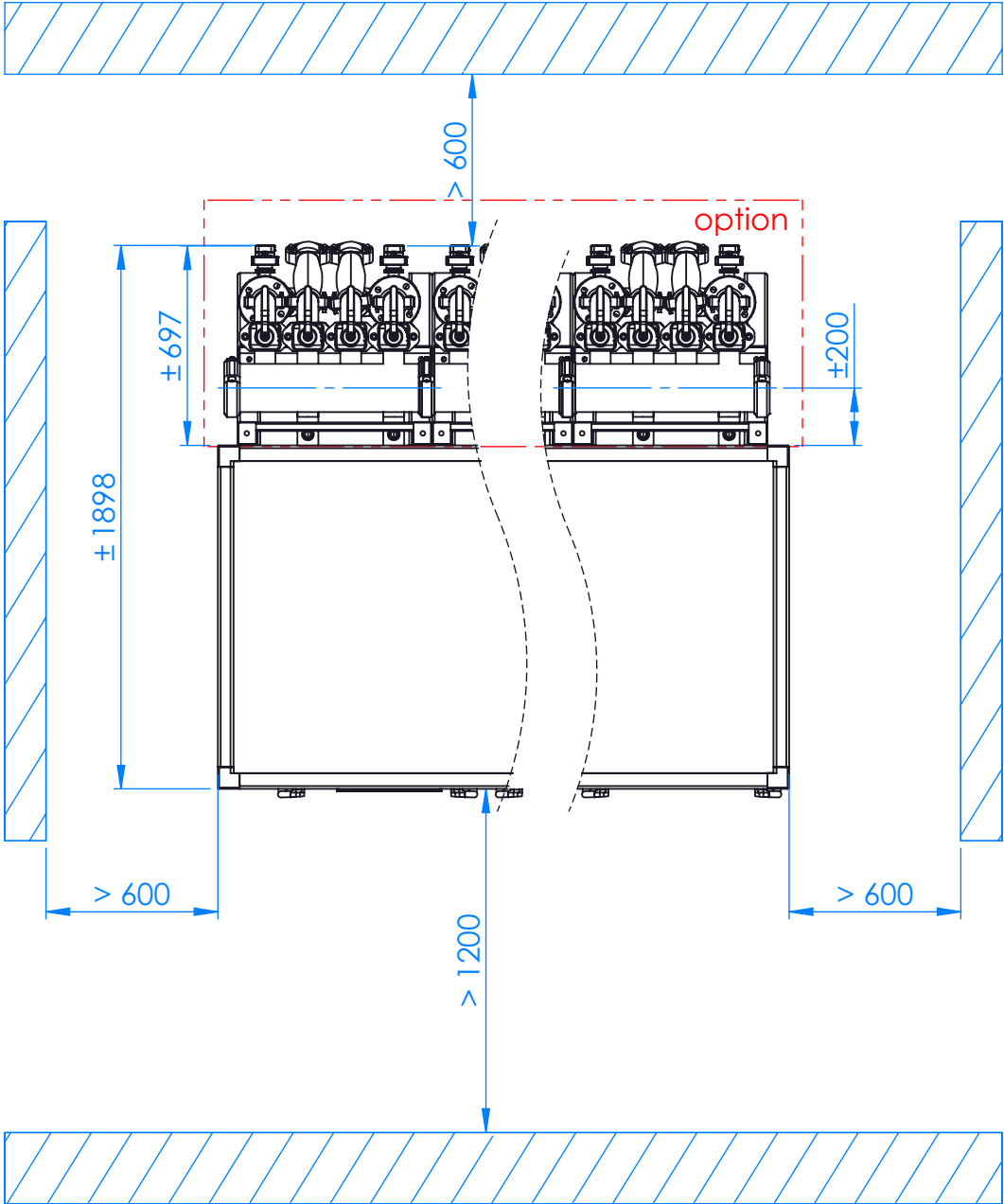


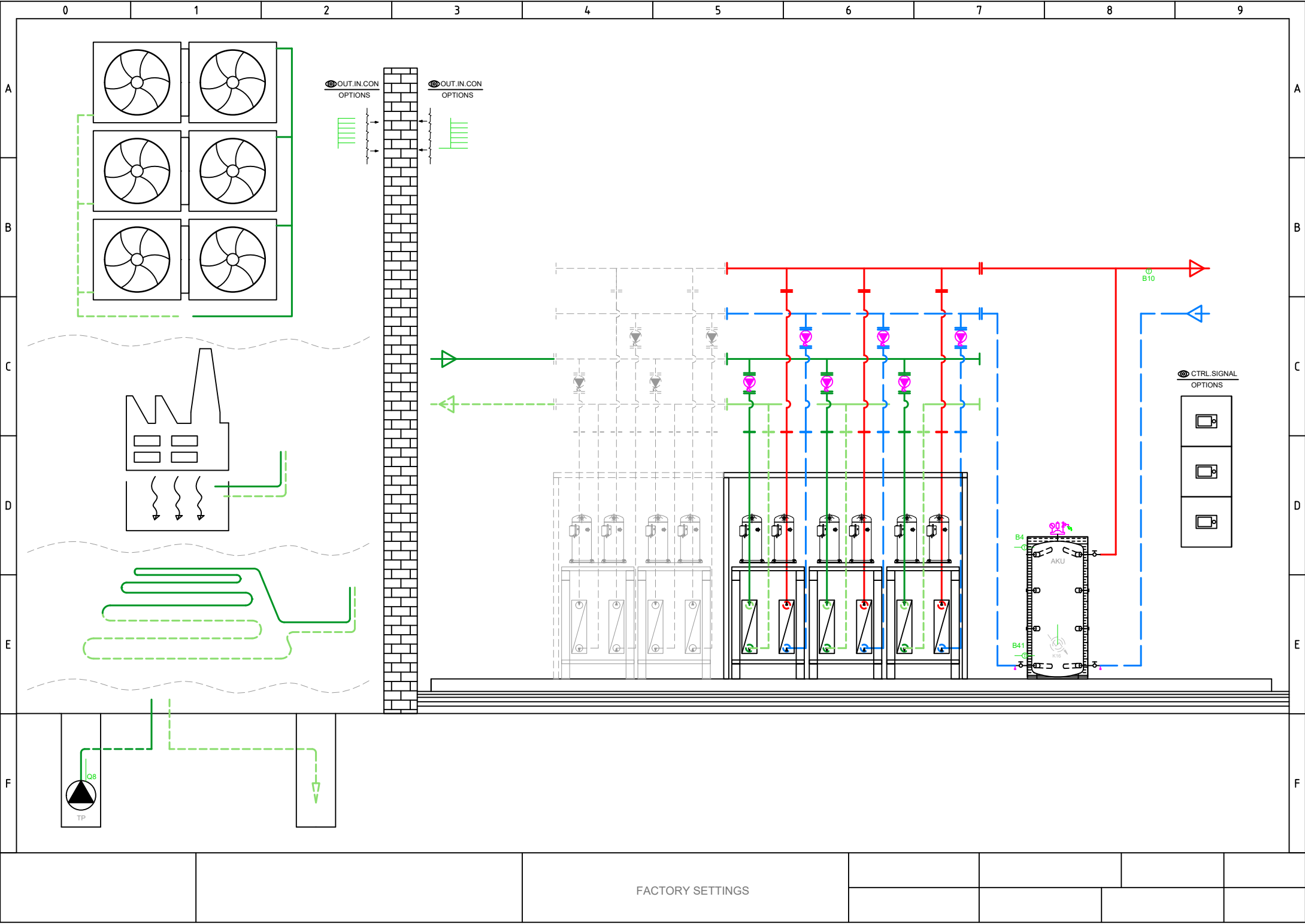
Temp °C











Total: max 6A  
1 x QX...: max 2A

Hlavné napájanie 230V / 50 Hz

Uzemnenie

Nulový vodič

|     |                               |
|-----|-------------------------------|
| E9  | Spínač nízkeho tlaku E9       |
| E10 | Spínač vysokého tlaku E10     |
| E15 | Spínač prietoku zdroja E15    |
| E24 | Spínač prietoku spotreby E24  |
| E6  | Blokovanie vys. tarify el. E6 |
| E12 | Preťaženie kompresora 2 E12   |
| E21 | Sled fáz E21                  |
| E22 | Sled fáz E22                  |
| E23 | Sled fáz E23                  |
| E11 | Preťaženie kompresora E11     |
| K1  | Kompresor I. stupeň K1        |

Q8 Čerpadlo zdroja Q8

Q9 Čerpadlo kondenzátora Q9

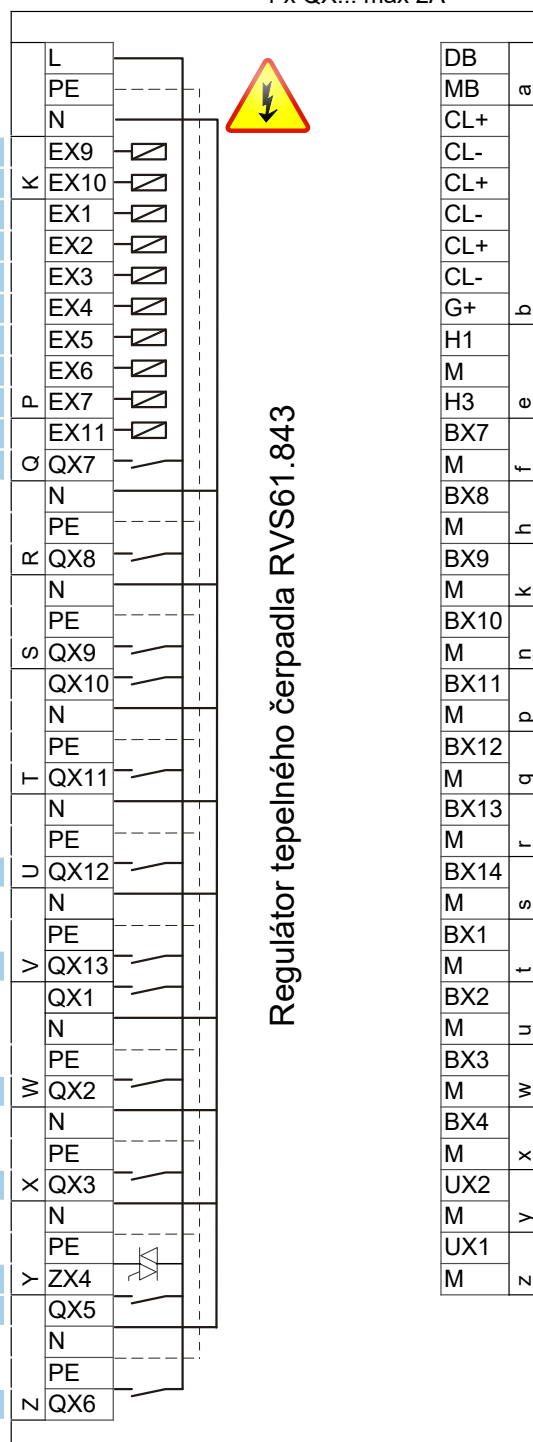
K10 Alarmový výstup K10

K40 Ohrev oleja K40

K81 Ventil výparníka K81

K82 Ventil EVI K82

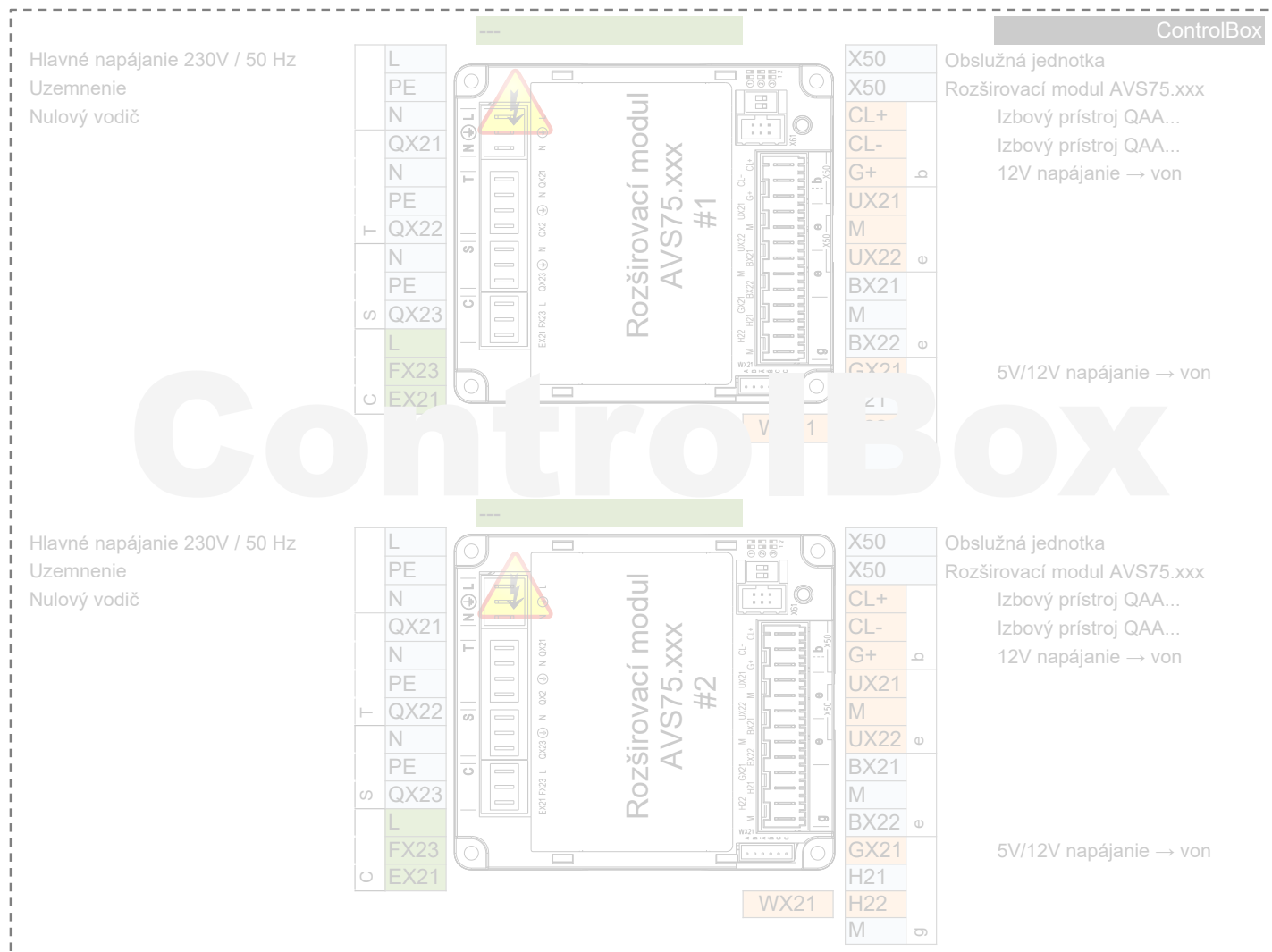
K2 Kompresor 2. stupeň K2



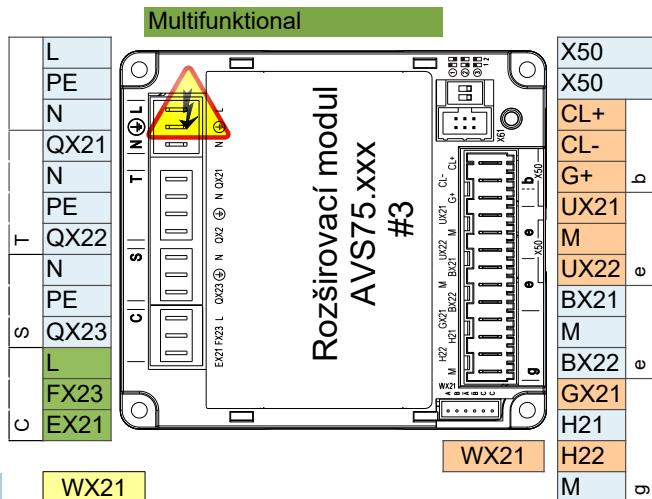
Regulátor tepelného čerpadla RVS61.843

|      |                                     |
|------|-------------------------------------|
| DB   | LPB Bus dáta                        |
| MB   | LPB Bus zem                         |
| CL+  | Izbový prístroj QAA...              |
| CL-  | Izbový prístroj QAA...              |
| CL+  | Izbový prístroj QAA... 2.           |
| CL-  | Izbový prístroj QAA... 2.           |
| CL+  | Izbový prístroj QAA... 3.           |
| CL-  | Izbový prístroj QAA... 3.           |
| G+   | 12V napájanie → von                 |
| H1   |                                     |
| M    |                                     |
| H3   | Požiadavka spotrebiča VK1           |
| BX7  | B81 Snímač horúcich plynov K1 B81   |
| M    |                                     |
| BX8  |                                     |
| M    |                                     |
| BX9  |                                     |
| M    |                                     |
| BX10 | B21 Snímač teploty výstupu TČ B21   |
| M    |                                     |
| BX11 |                                     |
| M    |                                     |
| BX12 | B71 Snímač teploty spiatočky TČ B71 |
| M    |                                     |
| BX13 | B91 Snímač vstupu zdroja B91        |
| M    |                                     |
| BX14 | B84 Snímač výstupu zdroja B92/B84   |
| M    |                                     |
| BX1  |                                     |
| M    |                                     |
| BX2  |                                     |
| M    |                                     |
| BX3  | B83 Snímač chladiaceho média B83    |
| M    |                                     |
| BX4  | B82 Snímač horúcich plynov K2 B82   |
| M    |                                     |
| UX2  | Čerpadlo kondenzátora Q9            |
| M    | 0..10V analógový signál             |
| UX1  | Čerpadlo zdroja Q8                  |
| M    | 0..10V analógový signál             |

|  |           |
|--|-----------|
|  | AVS75.390 |
|  | AVS75.391 |
|  | AVS75.370 |



Hlavné napájanie 230V / 50 Hz  
Uzemnenie  
Nulový vodič



Obslužná jednotka  
Rozširovací modul AVS75.xxx  
Izbový prístroj QAA...  
Izbový prístroj QAA...  
12V napájanie → von

B86 Snímač plynov sania EVI B86

B85 Snímač plynov sania B85

5V/12V napájanie → von

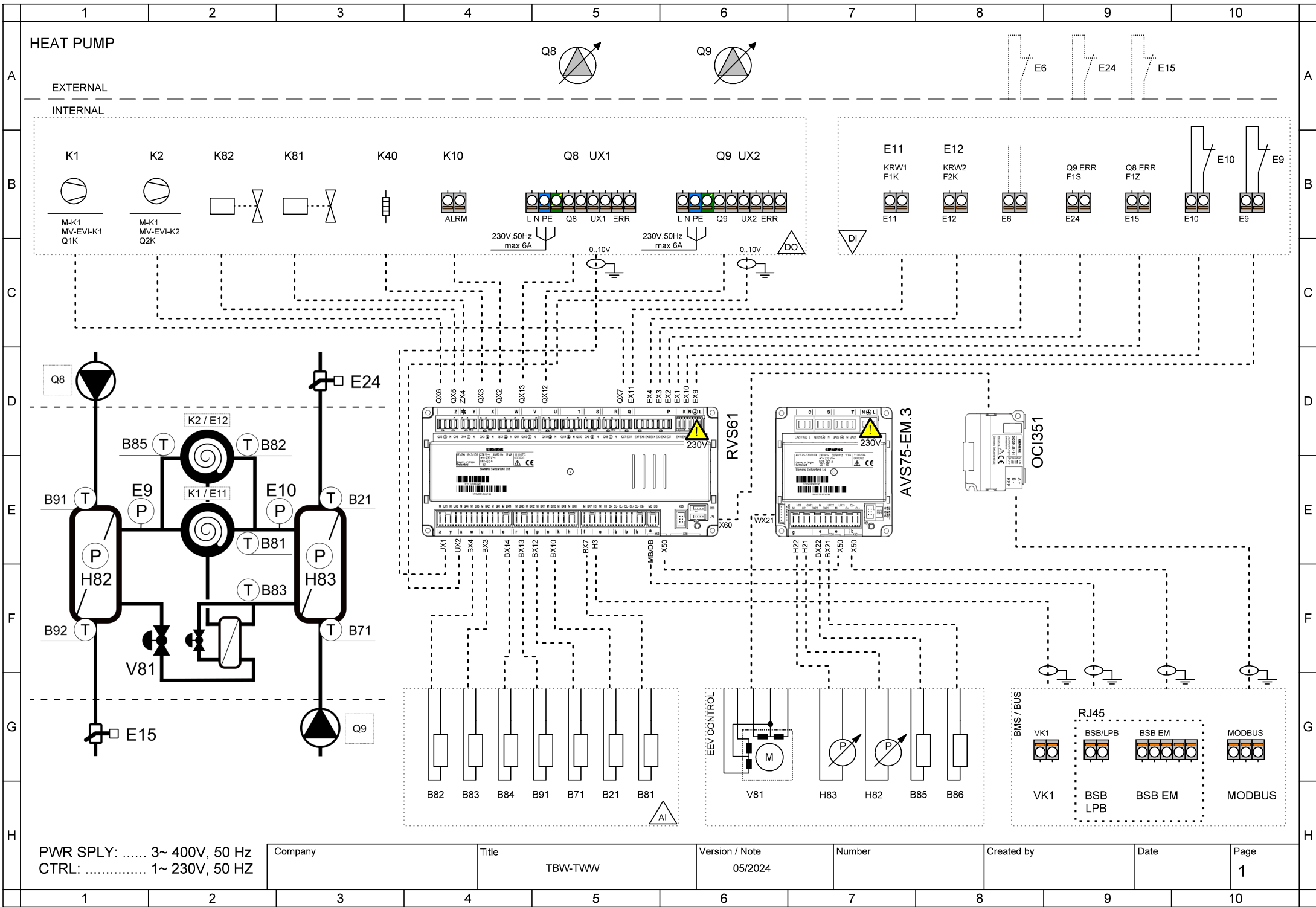
Nízky tlak 0..10V

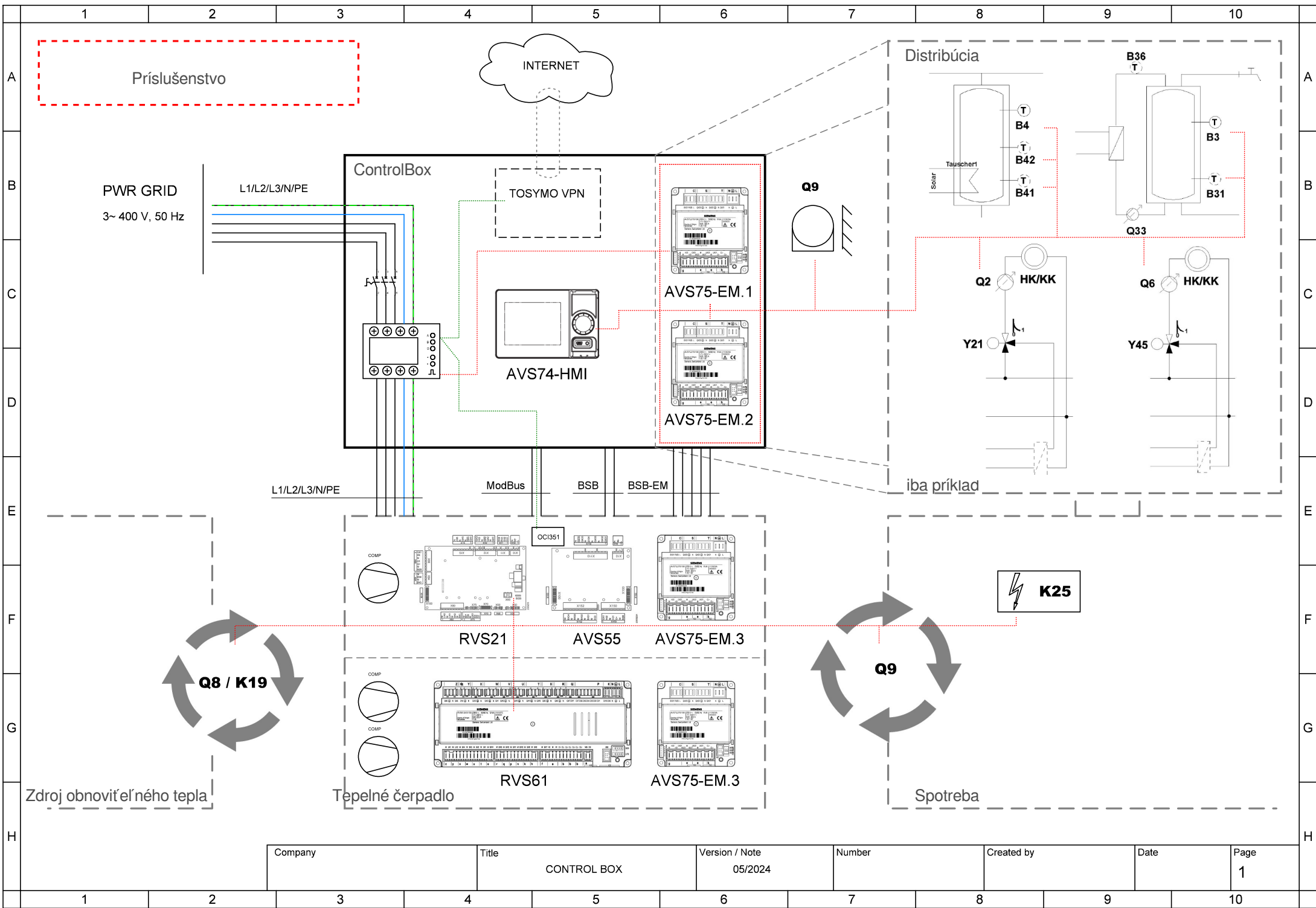
Vysoký tlak 0..10V

V81 EEV výparníka V81

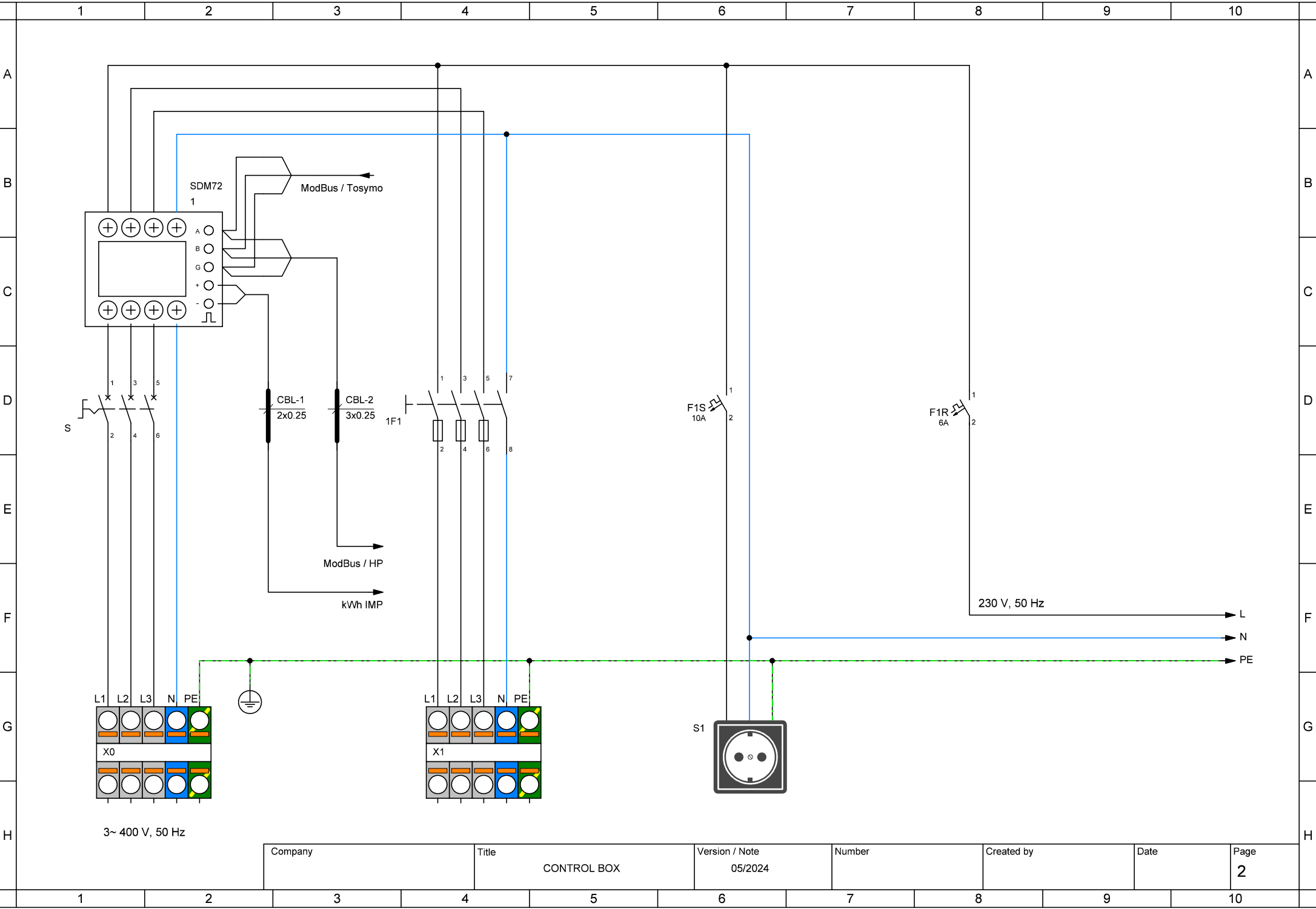
WX21

WX21





|         |             |                |        |            |      |      |
|---------|-------------|----------------|--------|------------|------|------|
| Company | Title       | Version / Note | Number | Created by | Date | Page |
|         | CONTROL BOX | 05/2024        |        |            |      | 1    |







|  |           |
|--|-----------|
|  | AVS75.390 |
|  | AVS75.391 |
|  | AVS75.370 |

## AVS75.370

Hlavné napájanie 230V / 50 Hz

Uzemnenie

Nulový vodič

Y1 Zmiešavací ventil otváranie

Y2 Zmiešavací ventil zatváranie

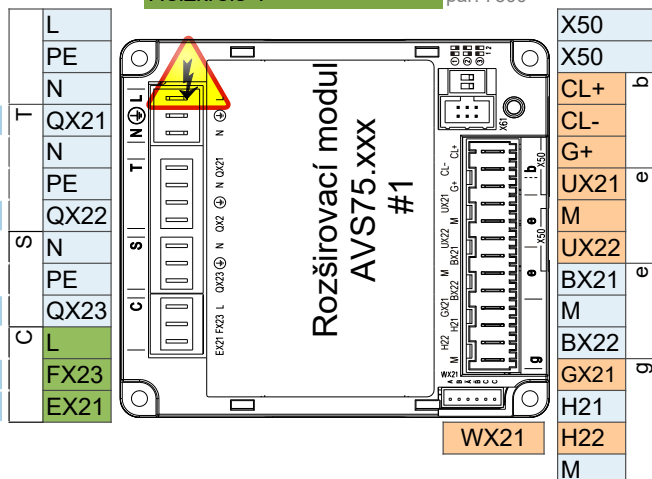
Q2 Čerpadlo vyk. okruhu 1 Q2

L Fáza 230V

E61 Smart Grid E61

## Heizkreis 1

par. 7300



Rozšiřovací modul AVS75.xxx

Izbový prístroj QAA...

Izbový prístroj QAA...

B1 Snímač prietoku 1

Čítanie pulzov

## AVS75.370

Hlavné napájanie 230V / 50 Hz

Uzemnenie

Nulový vodič

Q3 Servopohon TUV Q3

K6 El. výhrevná vložka TUV K6

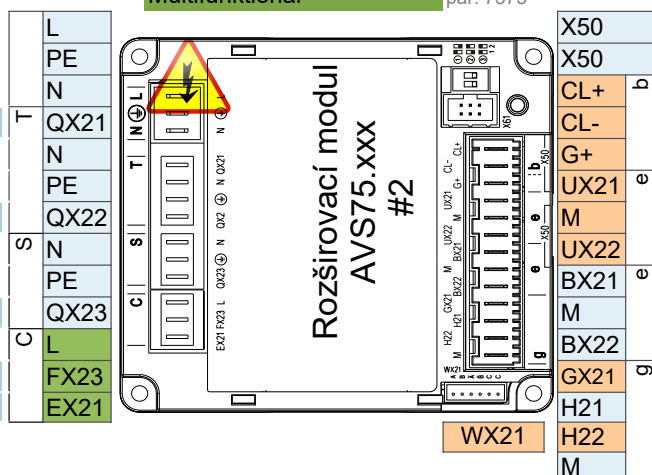
Q6 Čerpadlo vyk. okruhu 2 Q6

L Fáza 230V

E62 Smart Grid E62

## Multifunktional

par. 7375



Obslužná jednotka

Rozšiřovací modul AVS75.xxx

Izbový prístroj QAA...

Izbový prístroj QAA...

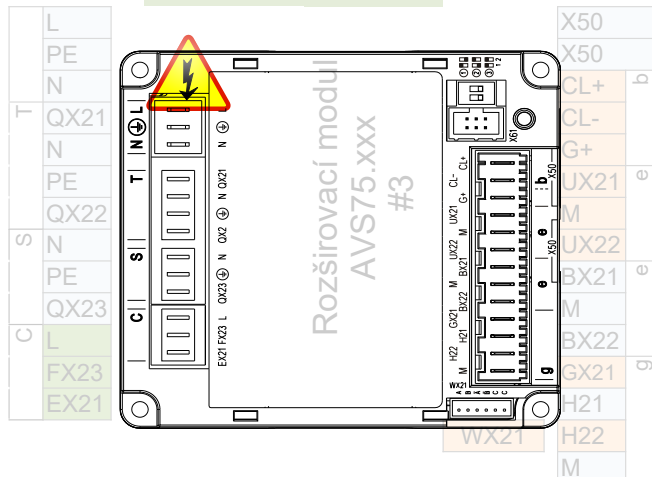
B3 Snímač TUV B3

B4 Snímač AKU zásobníka B4

Hlavné napájanie 230V / 50 Hz

Uzemnenie

Nulový vodič



Obslužná jednotka

Rozšiřovací modul AVS75.xxx

Izbový prístroj QAA...

Izbový prístroj QAA...

Pozor: Rozšiřovací modul 3 je v tepelnom čerpadle

## Možnosti pripojenia ovládania

### 1 ControlBox

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ControlBox s dvoma zabudovanými rozširujúcimi modulmi umožňuje početné možnosti ovládania aplikácie na strane spotrebiča za tepelným čerpadlom. Viac informácií nájdete v schéme ControlBoxu a v hárku s aplikačnými schémami.

### 2 Fixná žiadaná teplota výstupu - Zap / Vyp bezpotenciálny kontakt

---

2-vodičový tienený kábel 2 x 0,5 mm<sup>2</sup> - Nastavená hodnota = 45 °C (upraviteľné parametrom 1859)

Pripojovacia svorka - pozri schému zapojenia

### 3 Analógová regulácia žiadanej teploty výstupu 0..10V

---

2-vodičový tienený kábel 2 x 0,5 mm<sup>2</sup> - Nastavená hodnota: 0V = 16°C ~ 10V = 60°C ( možnosť úpravy v nastavení parametrov )

Pripojovacia svorka - pozri schému zapojenia

### 4 ModBus RTU komunikačný príkaz

---

3 žilový tienený kábel min. 3 x 0,25 mm<sup>2</sup>

Pre tabuľku mapovania ModBus kontaktujte technickú podporu

### 5 MQTT IoT komunikačný protokol

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Pre viac informácií kontaktujte technickú podporu