



**VACON NXS**  
**ROBUST DRIVE FOR HEAVY USE**

**VACON**  
DRIVEN BY DRIVES

# THE RELIABLE CHOICE

The Vacon NXS is a compact AC drive in the power range of 0.37—560 kW and supply voltages of 208—690 V for heavy use in machines, buildings and all branches of industry.

The robust design incorporates effective protection against supply network disturbances. Trip-free operation is also guaranteed due to sophisticated motor control principles and motor/drive protection features, component selection and effective cooling.

Enclosure classes of IP21 and IP54 and integrated high-level EMC filters make the Vacon NXS suitable for all environments.

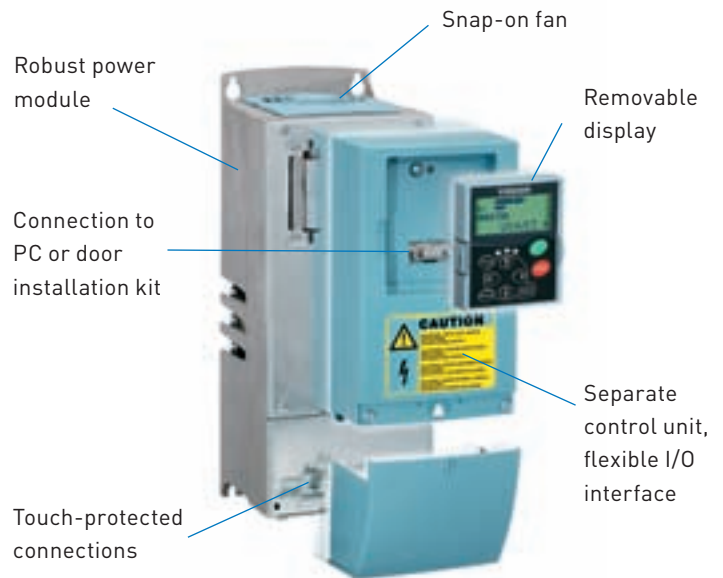
The Start-Up Wizard and the standard All-In-One Application Package make parameter setting extremely easy in all cases, from simple to complex.

The wide and flexible standard I/O and option for five I/O boards provide versatile controllability. The most common fieldbus options are also available.

The modular design of the Vacon NXS brings several advantages: the control terminals are safely separated from power terminals, upgrading the control inputs and outputs is easy and convenient, replacing the cooling fan (the only regularly replaceable component) is fast, the display panel can be utilized for parameter copying, etc.

## Features

- Easy to use display panel
- Interactive programming with Start-Up Wizard
- Versatile All-in-One Package
- PID controller and PFC for 1-5 pumps
- Special applications available (water application package, high speed, etc.)
- Five slots for control boards (2 basic boards and 3 option boards)
- High switching frequency, low noise
- Steady state speed error < 1%
- Low torque ripple
- Starting torque > 200%, depending on AC drive sizing
- Suitable for multi-motor applications



## VACON NXS IP21



FR4

FR5

FR6

FR7

FR8

FR9

## DESIGN & DIMENSIONS

The mechanical design is extremely compact. The IP54 units in particular are the smallest AC drives on the market. All units are suitable for both wall and enclosure mounting with all necessary components: integrated EMC filters, AC chokes, cable protection, dust and water protection. The effective super-cooling principle allows high ambient temperatures and high switching frequencies without derating.

### Mains voltage 380—500 V, 50/60 Hz, 3~, Wall-mounted units

| AC drive type          | Loadability                                 |                          |   |                          |                                | Motor shaft power |                   | Frame size | Dimensions W*H*D (mm) |
|------------------------|---|--------------------------|---|--------------------------|--------------------------------|-------------------|-------------------|------------|-----------------------|
|                        | Low (+40°C)                                 |                          | High (+50°C)                                |                          | Maximum current I <sub>S</sub> | 400 V supply      |                   |            |                       |
|                        | Rated continuous current I <sub>L</sub> (A) | 10% overload current (A) | Rated continuous current I <sub>H</sub> (A) | 50% overload current (A) |                                | 10% overl. P (kW) | 50% overl. P (kW) |            |                       |
| NXS 0003 5 A 2 H 1 SSS | 3.3   | 3.6                      | 2.2   | 3.3                      | 4.4                            | 1.1               | 0.75              | FR4        | 128*292*190           |
| NXS 0004 5 A 2 H 1 SSS | 4.3   | 4.7                      | 3.3   | 5.0                      | 6.2                            | 1.5               | 1.1               | FR4        | 128*292*190           |
| NXS 0005 5 A 2 H 1 SSS | 5.6   | 6.2                      | 4.3   | 6.5                      | 8.6                            | 2.2               | 1.5               | FR4        | 128*292*190           |
| NXS 0007 5 A 2 H 1 SSS | 7.6   | 8.4                      | 5.6   | 8.4                      | 10.8                           | 3                 | 2.2               | FR4        | 128*292*190           |
| NXS 0009 5 A 2 H 1 SSS | 9   | 9.9                      | 7.6   | 11.4                     | 14                             | 4                 | 3                 | FR4        | 128*292*190           |
| NXS 0012 5 A 2 H 1 SSS | 12  | 13.2                     | 9   | 13.5                     | 18                             | 5.5               | 4                 | FR4        | 128*292*190           |
| NXS 0016 5 A 2 H 1 SSS | 16  | 17.6                     | 12  | 18.0                     | 24                             | 7.5               | 5.5               | FR5        | 144*391*214           |
| NXS 0022 5 A 2 H 1 SSS | 23  | 25.3                     | 16  | 24.0                     | 32                             | 11                | 7.5               | FR5        | 144*391*214           |
| NXS 0031 5 A 2 H 1 SSS | 31  | 34                       | 23  | 35                       | 46                             | 15                | 11                | FR5        | 144*391*214           |
| NXS 0038 5 A 2 H 1 SSS | 38  | 42                       | 31  | 47                       | 62                             | 18.5              | 15                | FR6        | 195*519*237           |
| NXS 0045 5 A 2 H 1 SSS | 46  | 51                       | 38  | 57                       | 76                             | 22                | 18.5              | FR6        | 195*519*237           |
| NXS 0061 5 A 2 H 1 SSS | 61  | 67                       | 46  | 69                       | 92                             | 30                | 22                | FR6        | 195*519*237           |
| NXS 0072 5 A 2 H 0 SSS | 72  | 79                       | 61  | 92                       | 122                            | 37                | 30                | FR7        | 237*591*257           |
| NXS 0087 5 A 2 H 0 SSS | 87  | 96                       | 72  | 108                      | 144                            | 45                | 37                | FR7        | 237*591*257           |
| NXS 0105 5 A 2 H 0 SSS | 105   | 116                      | 87  | 131                      | 174                            | 55                | 45                | FR7        | 237*591*257           |
| NXS 0140 5 A 2 H 0 SSS | 140   | 154                      | 105   | 158                      | 210                            | 75                | 55                | FR8        | 291*758*344           |
| NXS 0168 5 A 2 H 0 SSS | 170   | 187                      | 140   | 210                      | 280                            | 90                | 75                | FR8        | 291*758*344           |
| NXS 0205 5 A 2 H 0 SSS | 205   | 226                      | 170   | 255                      | 336                            | 110               | 90                | FR8        | 291*758*344           |
| NXS 0261 5 A 2 H 0 SSF | 261   | 287                      | 205   | 308                      | 349                            | 132               | 110               | FR9        | 480*1150*362          |
| NXS 0300 5 A 2 H 0 SSF | 300   | 330                      | 245   | 368                      | 444                            | 160               | 132               | FR9        | 480*1150*362          |

### Mains voltage 380—500 V, 50/60 Hz, 3~, Standalone units

| AC drive type          | Loadability                                 |                          |   |                          |                                | Motor shaft power   |                     | Frame size | Dimensions W*H*D (mm) |
|------------------------|---|--------------------------|---|--------------------------|--------------------------------|---------------------|---------------------|------------|-----------------------|
|                        | Low (+40°C)                                 |                          | High (+40°C)                                |                          | Maximum current I <sub>S</sub> | 400 V supply        |                     |            |                       |
|                        | Rated continuous current I <sub>L</sub> (A) | 10% overload current (A) | Rated continuous current I <sub>H</sub> (A) | 50% overload current (A) |                                | 10% overload P (kW) | 50% overload P (kW) |            |                       |
| NXS 0385 5 A 2 L 0 SSA | 385   | 424                      | 300   | 450                      | 540                            | 200                 | 160                 | FR10       | 595*2020*602          |
| NXS 0460 5 A 2 L 0 SSA | 460   | 506                      | 385   | 578                      | 693                            | 250                 | 200                 | FR10       | 595*2020*602          |
| NXS 0520 5 A 2 L 0 SSA | 520   | 572                      | 460   | 690                      | 828                            | 250                 | 250                 | FR10       | 595*2020*602          |
| NXS 0590 5 A 2 L 0 SSA | 590   | 649                      | 520   | 780                      | 936                            | 315                 | 250                 | FR11       | 794*2020*602          |
| NXS 0650 5 A 2 L 0 SSA | 650   | 715                      | 590   | 885                      | 1062                           | 355                 | 315                 | FR11       | 794*2020*602          |
| NXS 0730 5 A 2 L 0 SSA | 730   | 803                      | 650   | 975                      | 1170                           | 400                 | 355                 | FR11       | 794*2020*602          |

### VACON NXS IP54



FR4

FR5

FR6

FR7

FR8

FR9

# PRODUCT RANGE

## Mains voltage 525—690 V, 50/60 Hz, 3~, Wall-mounted units

| AC drive type     | Loadability                                 |                          |   |                          |                                | Motor shaft power |                   |     | Frame size   | Dimensions W*H*D (mm) |
|-------------------|---|--------------------------|---|--------------------------|--------------------------------|-------------------|-------------------|-----|--------------|-----------------------|
|                   | Low (+40°C)                                 |                          | High (+50°C)                                |                          | Maximum current I <sub>S</sub> | 690 V supply      |                   |     |              |                       |
|                   | Rated continuous current I <sub>L</sub> (A) | 10% overload current (A) | Rated continuous current I <sub>H</sub> (A) | 50% overload current (A) |                                | 10% overl. P (kW) | 50% overl. P (kW) |     |              |                       |
| NXS 0004 6A2L0SSS | 4.5   | 5.0                      | 3.2   | 4.8                      | 6.4                            | 3                 | 2.2               | FR6 | 195*519*237  |                       |
| NXS 0005 6A2L0SSS | 5.5   | 6.1                      | 4.5   | 6.8                      | 9.0                            | 4                 | 3                 | FR6 | 195*519*237  |                       |
| NXS 0007 6A2L0SSS | 7.5   | 8.3                      | 5.5   | 8.3                      | 11.0                           | 5.5               | 4                 | FR6 | 195*519*237  |                       |
| NXS 0010 6A2L0SSS | 10  | 11.0                     | 7.5   | 11.3                     | 15.0                           | 7.5               | 5.5               | FR6 | 195*519*237  |                       |
| NXS 0013 6A2L0SSS | 13.5  | 14.9                     | 10  | 15.0                     | 20.0                           | 11                | 7.5               | FR6 | 195*519*237  |                       |
| NXS 0018 6A2L0SSS | 18  | 19.8                     | 13.5  | 20.3                     | 27                             | 15                | 11                | FR6 | 195*519*237  |                       |
| NXS 0022 6A2L0SSS | 22  | 24.2                     | 18  | 27.0                     | 36                             | 18.5              | 15                | FR6 | 195*519*237  |                       |
| NXS 0027 6A2L0SSS | 27  | 29.7                     | 22  | 33.0                     | 44                             | 22                | 18.5              | FR6 | 195*519*237  |                       |
| NXS 0034 6A2L0SSS | 34  | 37                       | 27  | 41                       | 54                             | 30                | 22                | FR6 | 195*519*237  |                       |
| NXS 0041 6A2L0SSS | 41  | 45                       | 34  | 51                       | 68                             | 37.5              | 30                | FR7 | 237*591*257  |                       |
| NXS 0052 6A2L0SSS | 52  | 57                       | 41  | 62                       | 82                             | 45                | 37.5              | FR7 | 237*591*257  |                       |
| NXS 0062 6A2L0SSS | 62  | 68                       | 52  | 78                       | 104                            | 55                | 45                | FR8 | 291*758*344  |                       |
| NXS 0080 6A2L0SSS | 80  | 88                       | 62  | 93                       | 124                            | 75                | 55                | FR8 | 291*758*344  |                       |
| NXS 0100 6A2L0SSS | 100   | 110                      | 80  | 120                      | 160                            | 90                | 75                | FR8 | 291*758*344  |                       |
| NXS 0125 6A2L0SSF | 125   | 138                      | 100   | 150                      | 200                            | 110               | 90                | FR9 | 480*1150*362 |                       |
| NXS 0144 6A2L0SSF | 144   | 158                      | 125   | 188                      | 213                            | 132               | 110               | FR9 | 480*1150*362 |                       |
| NXS 0170 6A2L0SSF | 170   | 187                      | 144   | 216                      | 245                            | 160               | 132               | FR9 | 480*1150*362 |                       |
| NXS 0208 6A2L0SSF | 208   | 229                      | 170   | 255                      | 289                            | 200               | 160               | FR9 | 480*1150*362 |                       |

For all Vacon NXS drives, overloadability is defined as follows:

High: 1.5 x I<sub>H</sub> (1 min/10 min) @ 50°C; Low: 1.1 x I<sub>L</sub> (1 min/10 min) @ 40°C; I<sub>S</sub> for 2 sec every 20 sec.

## Mains voltage 525—690 V, 50/60 Hz, 3~, Standalone units

| AC drive type      | Loadability                                 |                          |   |                          |                                | Motor shaft power   |                     |      | Frame size   | Dimensions W*H*D (mm) |
|--------------------|---|--------------------------|---|--------------------------|--------------------------------|---------------------|---------------------|------|--------------|-----------------------|
|                    | Low (+40°C)                                 |                          | High (+40°C)                                |                          | Maximum current I <sub>S</sub> | 690 V supply        |                     |      |              |                       |
|                    | Rated continuous current I <sub>L</sub> (A) | 10% overload current (A) | Rated continuous current I <sub>H</sub> (A) | 50% overload current (A) |                                | 10% overload P (kW) | 50% overload P (kW) |      |              |                       |
| NXS 0261 6A2L0SSA  | 261   | 287                      | 208   | 312                      | 375                            | 250                 | 200                 | FR10 | 595*2020*602 |                       |
| NXS 0325 6A2L0SSA  | 325   | 358                      | 261   | 392                      | 470                            | 315                 | 250                 | FR10 | 595*2020*602 |                       |
| NXS 0385 6A2L0SSA  | 385   | 424                      | 325   | 488                      | 585                            | 355                 | 315                 | FR10 | 595*2020*602 |                       |
| NXS 0416 6A2L0SSA* | 416   | 458                      | 325   | 488                      | 585                            | 400                 | 315                 | FR10 | 595*2020*602 |                       |
| NXS 0460 6A2L0SSA  | 460   | 506                      | 385   | 578                      | 693                            | 450                 | 355                 | FR11 | 794*2020*602 |                       |
| NXS 0502 6A2L0SSA  | 502   | 552                      | 460   | 690                      | 828                            | 500                 | 450                 | FR11 | 794*2020*602 |                       |
| NXS 0590 6A2L0SSA* | 590   | 649                      | 502   | 753                      | 904                            | 560                 | 500                 | FR11 | 794*2020*602 |                       |

\* max. ambient temperature of +35°C

## Hardware configurations, Standalone units

| FUNCTION                                     | AVAILABILITY          |
|--|-----------------------|
| IP21   | Standard              |
| IP54 (FR10 only)                             | Optional (H: +20mm)   |
| Integrated fuses                             | Standard              |
| Integrated load switch                       | Optional              |
| EMC filtering L                              | Standard              |
| EMC filtering T                              | Optional              |
| Integrated brake chopper (cabling top entry) | Optional (H: +122 mm) |



FR10



FR11

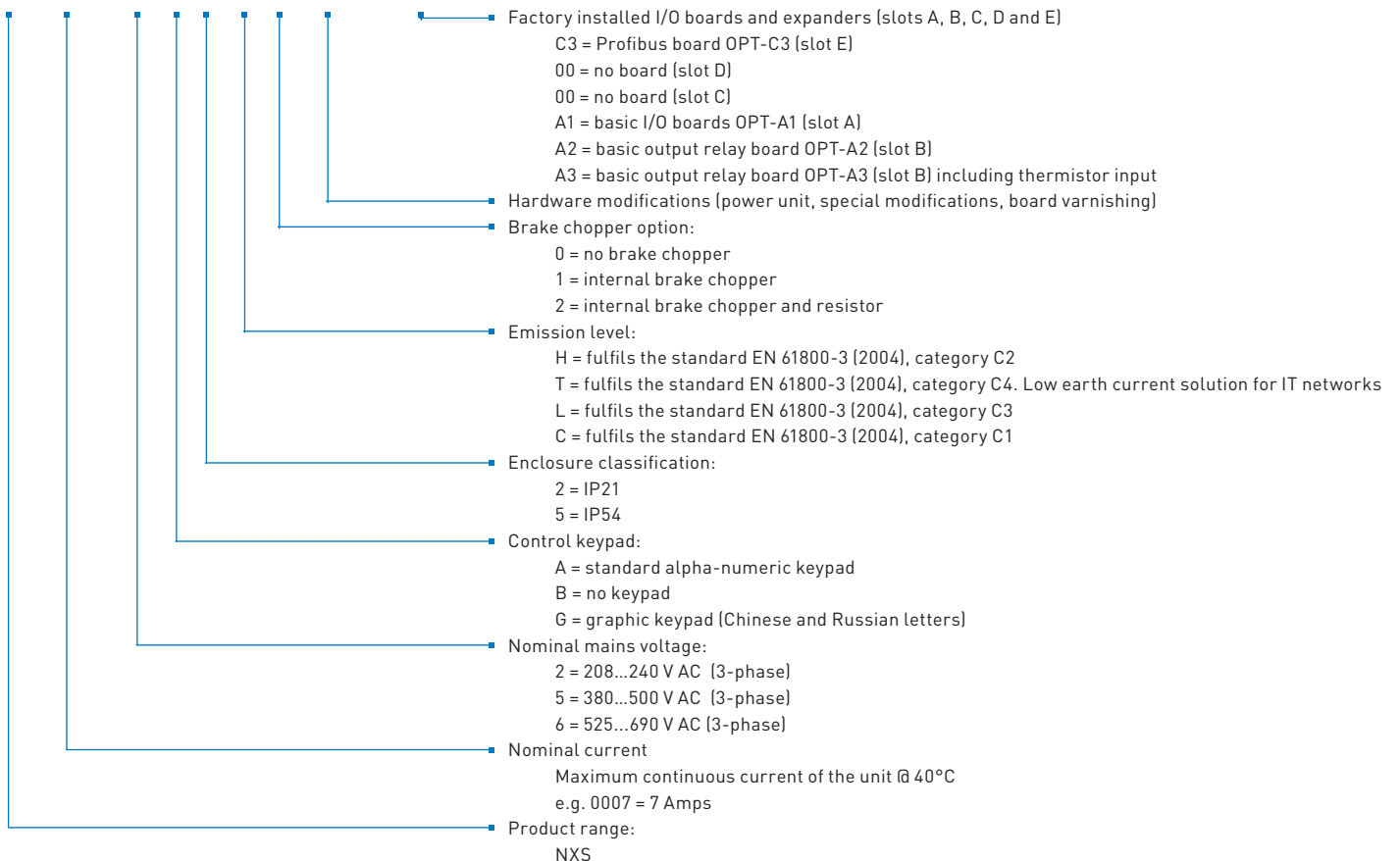
# PRODUCT RANGE

## Mains voltage 208—240 V, 50/60 Hz, 3~, Wall-mounted units

| AC drive type          | Loadability                                 |                          |   |                          |                                | Motor shaft power |                   | Frame size | Dimensions W*H*D (mm) |
|------------------------|---|--------------------------|---|--------------------------|--------------------------------|-------------------|-------------------|------------|-----------------------|
|                        | Low (+40°C)                                 |                          | High (+50°C)                                |                          | Maximum current I <sub>S</sub> | 230 V supply      |                   |            |                       |
|                        | Rated continuous current I <sub>L</sub> (A) | 10% overload current (A) | Rated continuous current I <sub>H</sub> (A) | 50% overload current (A) |                                | 10% overl. P (kW) | 50% overl. P (kW) |            |                       |
| NXS 0003 2 A 2 H 1 SSS | 3.7   | 4.1                      | 2.4   | 3.6                      | 4.8                            | 0.55              | 0.37              | FR4        | 128*292*190           |
| NXS 0004 2 A 2 H 1 SSS | 4.8   | 5.3                      | 3.7   | 5.6                      | 7.4                            | 0.75              | 0.55              | FR4        | 128*292*190           |
| NXS 0007 2 A 2 H 1 SSS | 6.6   | 7.3                      | 4.8   | 7.2                      | 9.6                            | 1.1               | 0.75              | FR4        | 128*292*190           |
| NXS 0008 2 A 2 H 1 SSS | 7.8   | 8.6                      | 6.6   | 9.9                      | 13.2                           | 1.5               | 1.1               | FR4        | 128*292*190           |
| NXS 0011 2 A 2 H 1 SSS | 11  | 12.1                     | 7.8   | 11.7                     | 15.6                           | 2.2               | 1.5               | FR4        | 128*292*190           |
| NXS 0012 2 A 2 H 1 SSS | 12.5  | 13.8                     | 11  | 16.5                     | 22                             | 3                 | 2.2               | FR4        | 128*292*190           |
| NXS 0017 2 A 2 H 1 SSS | 17.5  | 19.3                     | 12.5  | 18.8                     | 25                             | 4                 | 3                 | FR5        | 144*391*214           |
| NXS 0025 2 A 2 H 1 SSS | 25  | 27.5                     | 17.5  | 26.3                     | 35                             | 5.5               | 4                 | FR5        | 144*391*214           |
| NXS 0031 2 A 2 H 1 SSS | 31  | 34.1                     | 25  | 37.5                     | 50                             | 7.5               | 5.5               | FR5        | 144*391*214           |
| NXS 0048 2 A 2 H 1 SSS | 48  | 52.8                     | 31  | 46.5                     | 62                             | 11                | 7.5               | FR6        | 195*519*237           |
| NXS 0061 2 A 2 H 1 SSS | 61  | 67.1                     | 48  | 72.0                     | 96                             | 15                | 11                | FR6        | 195*519*237           |
| NXS 0075 2 A 2 H 0 SSS | 75  | 83                       | 61  | 92                       | 122                            | 18.5              | 15                | FR7        | 237*591*257           |
| NXS 0088 2 A 2 H 0 SSS | 88  | 97                       | 75  | 113                      | 150                            | 22                | 18.5              | FR7        | 237*591*257           |
| NXS 0114 2 A 2 H 0 SSS | 114   | 125                      | 88  | 132                      | 176                            | 30                | 22                | FR7        | 237*591*257           |
| NXS 0140 2 A 2 H 0 SSS | 140   | 154                      | 105   | 158                      | 210                            | 37                | 30                | FR8        | 291*758*344           |
| NXS 0170 2 A 2 H 0 SSS | 170   | 187                      | 140   | 210                      | 280                            | 45                | 37                | FR8        | 291*758*344           |
| NXS 0205 2 A 2 H 0 SSS | 205   | 226                      | 170   | 255                      | 336                            | 55                | 45                | FR8        | 291*758*344           |
| NXS 0261 2 A 2 H 0 SSF | 261   | 287                      | 205   | 308                      | 349                            | 75                | 55                | FR9        | 480*1150*362          |
| NXS 0300 2 A 2 H 0 SSF | 300   | 330                      | 245   | 368                      | 444                            | 90                | 75                | FR9        | 480*1150*362          |

## VACON NXS TYPE DESIGNATION CODE

### NXS 0007 5 A 2 H 1 SSS A1A20000C3



## VACON NXS CONTROL UNIT

There are no fixed inputs or outputs in the Vacon NXS. There are five slots (A, B, C, D and E) for I/O boards, and a suitable board can be selected for each slot (see the table below).

The NXS units are delivered with OPT-A1 and OPT-A2 boards if the I/O is not specified. In many countries, boards OPT-A1 and OPT-A3 are used as standard I/O as the galvanically isolated thermistor input is often required.

Removable terminals, snap-in card installation, automatic card identification and instructions on the drive help making quick connections. If necessary, the inputs, outputs and fieldbus boards can be added in the field. The Vacon NXS is simply the most flexible frequency converter series on the market.

An external +24 V supply option enables communication with the control unit even if the mains supply is switched off (e.g. fieldbus communication and parameter settings).



## VACON OPTION BOARDS

| Card typecode                     | Card slot |   |   |   |   | I / O signal |    |          |                |                   |               |                   |                |                |             |       |                    |       |                        | NOTE                                      |            |
|-----------------------------------|-----------|---|---|---|---|--------------|----|----------|----------------|-------------------|---------------|-------------------|----------------|----------------|-------------|-------|--------------------|-------|------------------------|---|------------|
|                                   | A         | B | C | D | E | DI           | DO | DI<br>DO | AI<br>mA<br>±V | AI<br>mA<br>isol. | AO<br>mA<br>V | AO<br>mA<br>isol. | RO<br>NO<br>NC | RO<br>NO<br>NC | +10V<br>ref | Therm | +24<br>EXT<br>+24V | Pt100 | 42-240<br>VAC<br>input |   |            |
| <b>Basic I/O cards (OPT-A)</b>    |           |   |   |   |   |              |    |          |                |                   |               |                   |                |                |             |       |                    |       |                        |   |            |
| OPT-A1                            |           |   |   |   |   | 6            | 1  |          | 2              |                   | 1             |                   |                |                | 1           |       | 2                  |       |                        |   |            |
| OPT-A2                            |           |   |   |   |   |              |    |          |                |                   |               |                   | 2              |                |             |       |                    |       |                        |   |            |
| OPT-A3                            |           |   |   |   |   |              |    |          |                |                   |               |                   | 1              | 1              |             | 1     |                    |       |                        |   |            |
| OPT-A8                            |           |   |   |   |   | 6            | 1  |          | 2              |                   | 1             |                   |                |                | 1           |       | 2                  |       |                        | 1)  |            |
| OPT-A9                            |           |   |   |   |   | 6            | 1  |          | 2              |                   | 1             |                   |                |                | 1           |       | 2                  |       |                        | 2,5 mm <sup>2</sup> terminals             |            |
| <b>I/O expander cards (OPT-B)</b> |           |   |   |   |   |              |    |          |                |                   |               |                   |                |                |             |       |                    |       |                        |   |            |
| OPT-B1                            |           |   |   |   |   |              |    | 6        |                |                   |               |                   |                |                |             |       | 1                  |       |                        | Selectable DI/DO                          |            |
| OPT-B2                            |           |   |   |   |   |              |    |          |                |                   |               |                   | 1              | 1              |             | 1     |                    |       |                        |   |            |
| OPT-B4                            |           |   |   |   |   |              |    |          |                | 1                 | 2             |                   |                |                |             |       | 1                  |       |                        | 2)  |            |
| OPT-B5                            |           |   |   |   |   |              |    |          |                |                   |               |                   |                | 3              |             |       |                    |       |                        |   |            |
| OPT-B8                            |           |   |   |   |   |              |    |          |                |                   |               |                   |                |                |             |       | 1                  | 3     |                        |   |            |
| OPT-B9                            |           |   |   |   |   |              |    |          |                |                   |               |                   |                | 1              |             |       |                    |       |                        | 5   |            |
| <b>Fieldbus cards (OPT-C)</b>     |           |   |   |   |   |              |    |          |                |                   |               |                   |                |                |             |       |                    |       |                        |   |            |
| OPT-C2                            |           |   |   |   |   |              |    |          |                |                   |               |                   |                |                |             |       |                    |       |                        | RS-485 (Multiprotocol)                    | Modbus, N2 |
| OPT-C3                            |           |   |   |   |   |              |    |          |                |                   |               |                   |                |                |             |       |                    |       |                        | Profibus DP                               |            |
| OPT-C4                            |           |   |   |   |   |              |    |          |                |                   |               |                   |                |                |             |       |                    |       |                        | LonWorks                                  |            |
| OPT-C5                            |           |   |   |   |   |              |    |          |                |                   |               |                   |                |                |             |       |                    |       |                        | Profibus DP (D9 type connector)           |            |
| OPT-C6                            |           |   |   |   |   |              |    |          |                |                   |               |                   |                |                |             |       |                    |       |                        | CANopen (slave)                           |            |
| OPT-C7                            |           |   |   |   |   |              |    |          |                |                   |               |                   |                |                |             |       |                    |       |                        | DeviceNet                                 |            |
| OPT-C8                            |           |   |   |   |   |              |    |          |                |                   |               |                   |                |                |             |       |                    |       |                        | RS-485 (Multiprotocol, D9 type connector) | Modbus, N2 |
| OPT-CI                            |           |   |   |   |   |              |    |          |                |                   |               |                   |                |                |             |       |                    |       |                        | Modbus/TCP                                |            |
| OPT-CJ                            |           |   |   |   |   |              |    |          |                |                   |               |                   |                |                |             |       |                    |       |                        | BACNet                                    |            |

NOTES: Allowed slots for the board are marked in blue.

1) analogue signals galvanically isolated as a group, 2) analogue signals galvanically isolated separately.

# VACON NXS STANDARD I/O

## OPT-A1

| Terminal | Defaults settings                      | Programmable         |
|----------|--|----------------------|
| 1 +10V   | Reference voltage                      |                      |
| 2 AI1+   | Frequency reference 0–10 V             | -10–+10 V, 0/4–20 mA |
| 3 AI1-   | AI common (GND)                        | Differential         |
| 4 AI2+   | Frequency reference 4–20 mA            | 0–20mA, 0/-10 V–10 V |
| 5 AI2-   | AI common (differential)               | GND                  |
| 6 +24V   | Control supply (bidirectional)         |                      |
| 7 GND    | I/O Ground                             |                      |
| 8 DIN1   | Start forward                          | Many possibilities   |
| 9 DIN2   | Start reverse                          | Many possibilities   |
| 10 DIN3  | External fault input                   | Many possibilities   |
| 11 CMA   | Common for DIN1 - DIN3 (GND)           | Floating             |
| 12 +24V  | Control supply (bidirectional)         |                      |
| 13 GND   | I/O Ground                             |                      |
| 14 DIN4  | Multi-step speed select 1              | Many possibilities   |
| 15 DIN5  | Multi-step speed select 2              | Many possibilities   |
| 16 DIN6  | Fault reset                            | Many possibilities   |
| 17 CMB   | Common for DIN4 - DIN6 (GND)           | Floating             |
| 18 AO1+  | Output frequency (0–20 mA)             | Many possibilities   |
| 19 AO1-  | AO common (GND)                        | 4–20 mA, 0–10 V      |
| 20 DO1   | READY, $I \leq 50$ mA, $U \leq 48$ VDC | Many possibilities   |

## OPT-A2

| Terminal | Defaults settings | Programmable |
|----------|-------------------|--------------|
| 21 R01   |                   |              |
| 22 R01   |                   | RUN          |
| 23 R01   |                   |              |
| 24 R02   |                   |              |
| 25 R02   |                   | FAULT        |
| 26 R02   |                   |              |

## OPT-A3 (alternative)

| Terminal | Defaults settings | Programmable    |
|----------|-------------------|-----------------|
| 21 R01   |                   |                 |
| 22 R01   |                   | RUN             |
| 23 R01   |                   |                 |
| 25 R02   |                   | FAULT           |
| 26 R02   |                   |                 |
| 28 TI1+  | Thermistor        | Warning, fault, |
| 29 TI1-  | input fault       | no response     |

Default settings of OPT-A1, OPT-A2 and OPT-A3 for the Basic and Standard Applications.

## OTHER TYPICAL OPTIONS

| OPTION  | ORDER TYPECODE       | AVAILABILITY     | NOTE   |
|---|----------------------|------------------|--|
| IP54 enclosure                                  | Factory option       | All              | Replace '2' by '5' in the type code, e.g. NXS02605A5H0 (SSS...)  |
|   | IP5-FR_              | FR4, FR5, FR6    | IP54 kit, e.g. IP5-FR4   |
| Through-hole mounting                           | Factory option       | FR4-FR9          | E.g. NXS02605ATH0STS..., IP54 back, IP21 front, kits available   |
| Integrated brake choppers                       | Standard             | FR4-6/230, 500 V | E.g. NXS00455A2H1 (SSS...)   |
|   | Factory option       | FR7-, FR6-/690 V | E.g. NXS02605A2H1 (SSS...)   |
| External brake resistors<br>(380 - 500 V range) | BRR-0022-LD-5        | 00035-00225      | LD = Light duty: 5 sec nominal torque braking from nominal speed decreasing linearly to zero, once per 120 sec.<br>HD = Heavy duty: 3 sec nominal torque braking at nominal speed + 7 sec nominal torque braking from nominal speed decreasing linearly to zero, once per 120 sec.<br>Replace LD by HD in the type code, e.g. BRR-0105- <b>HD</b> -5<br>Brake resistors are also available for 208-240 V and 525-690 V NXS drives<br>The brake resistor manual is available for more precise selection |
|   | BRR-0031-LD-5        | 00315            |  |
|   | BRR-0045-LD-5        | 00385-00455      |  |
|   | BRR-0061-LD-5        | 00615            |  |
|   | BRR-0105-LD-5        | 00725-01055      |  |
| BRR-0300-LD-5                                   | 01405-03005          |                  |  |
| Integrated brake resistors                      | Factory option       | FR4-6/500 V      | Replace '1' by '2' in the typecode, e.g. NXS00455A2H2 (SSS...)<br>Light duty: 2 sec nominal torque braking from nominal speed decreasing linearly to zero, once per 60 sec.  |
| Graphical display panel                         | Factory option       | All              | Replace 'A' by 'G', e.g. NXS00455G2H1 (SSS...), supports Chinese & Russian   |
|   | PAN-G                | All              | Order typecode when ordered separately   |
| Panel door installation sets                    | DRA-02B (-04B, -15B) | All              | Length of RS232C cable is specified in the typecode, e.g. DRA-02B includes 2-meter RS232C cable  |
| Varnished circuit boards                        | Factory option       | All              | Frame sizes FR4-FR8: replace the 'S' by 'V', e.g. NXS00455A2H1SSV..., frame size FR9-FR11: replace 'S' by 'G'  |
| C-level RFI filters                             | Factory option       | FR4-6/500 V      | Replace 'H' by 'C' in the typecode, e.g. NXS00455A5C1 (SSS...)   |
| Du/dt & sinus filters                           |                      |                  | Available for all drives, contact local Vacon supplier   |



# FIRST-CLASS USABILITY



The uncluttered text display panel with a well-defined menu structure and functions such as automatic parameter copy and start-up wizard makes commissioning and fine-tuning as easy as possible.



A maximum of three values can be monitored simultaneously (the multi-monitoring feature).

The Vacon PC tools are available for downloading from the Vacon website at <http://www.vacon.com>. These include:

- Vacon NCDriver for parameter setting, copying, storing, printing, monitoring and controlling
- Vacon NCLoad for software updating and uploading special software to the drive
- Vacon NC61131-3 Engineering is available for making tailor-made software. A license key and training required.

The Vacon PC tools require only an RS232C cable for communication with the drive (no adapters etc. required).

### Basic

| I/O | Defaults       |   |
|-----|----------------|---|
| A11 | fref           | P |
| A12 | fref           | P |
| D11 | Start forward  |   |
| D12 | Start reverse  |   |
| D13 | External fault | P |
| D14 | Speed select 1 |   |
| D15 | Speed select 2 |   |
| D16 | Fault reset    |   |
| A01 | fout           | P |
| D01 | Ready          |   |
| R01 | Run            |   |
| R02 | Fault          |   |

Suitable for most purposes

### Standard

| I/O | Defaults       |   |
|-----|----------------|---|
| A11 | fref           | P |
| A12 | fref           | P |
| D11 | Start forward  | P |
| D12 | Start reverse  | P |
| D13 | External fault | P |
| D14 | Speed select 1 |   |
| D15 | Speed select 2 |   |
| D16 | Fault reset    |   |
| A01 | fout           | P |
| D01 | Ready          | P |
| R01 | Run            | P |
| R02 | Fault          | P |

Basic, with more programming possibilities

### Local/Remote

| I/O | Defaults        |   |
|-----|-----------------|---|
| A11 | B fref          | P |
| A12 | A fref          | P |
| D11 | A Start forward | P |
| D12 | A Start reverse | P |
| D13 | External fault  | P |
| D14 | B Start forward | P |
| D15 | B Start reverse | P |
| D16 | A/B selection   |   |
| A01 | fout            | P |
| D01 | Ready           | P |
| R01 | Run             | P |
| R02 | Fault           | P |

Two external control places

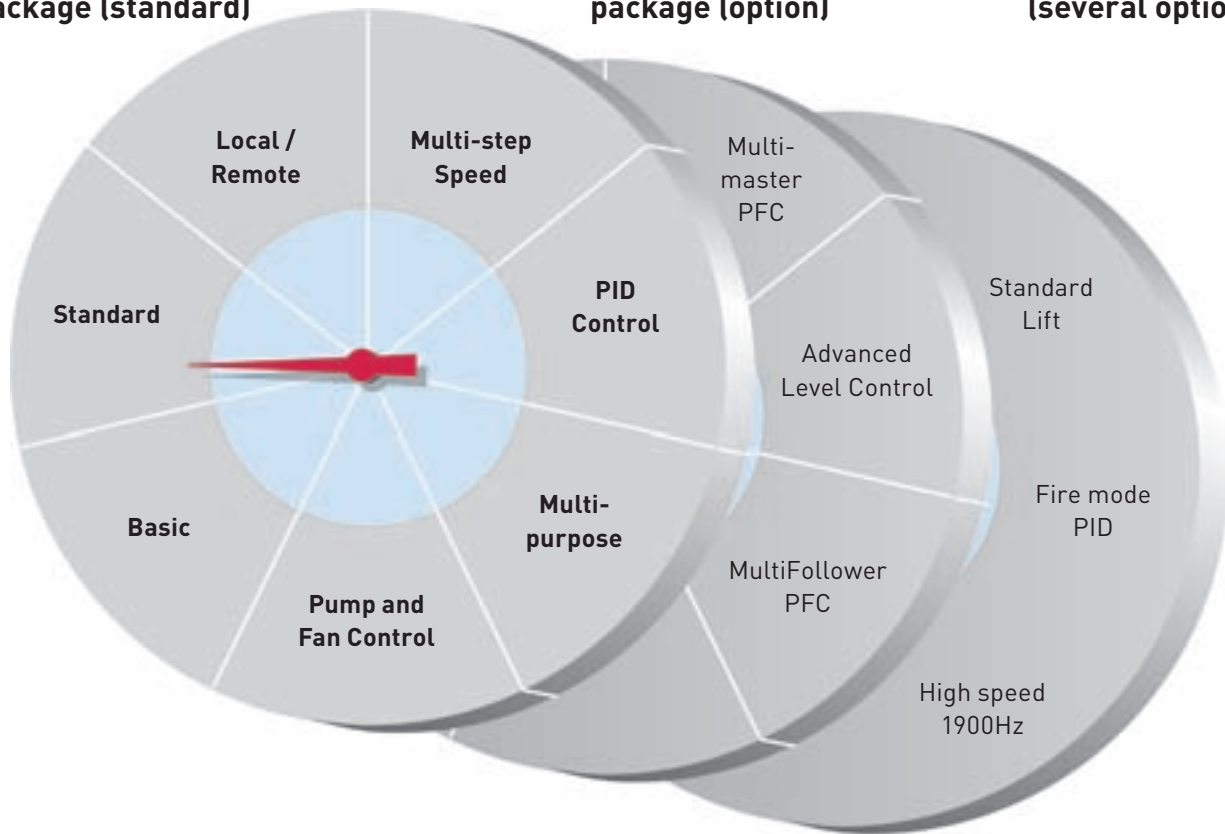


# SOFTWARE MODULARITY

## All-in-one Application package (standard)

## Water Solutions application package (option)

## Special Applications (several options)



The All-in-One application package has seven applications (=default settings and functionality of control inputs and outputs, see tables below) which can be selected with one parameter. The application will also be requested by the Start-up Wizard at the first power-up. With this single setting, the controls can be programmed e.g. for two external control places or a pressure control with the integrated PID controller. In most cases, the default basic application is suitable and only the min/max frequencies as well as motor nominal values must be set.

Thanks to the modular software applications made by the Vacon NC61131-3 Engineering tool, the All-in-One application package can be replaced by the Water application package that contains several applications optimized for water handling. There are also several other general-purpose software applications available.

P = Programmable

### Multi-step Speed Control

| I/O | Defaults         |   |
|-----|------------------|---|
| A11 | f <sub>ref</sub> | P |
| A12 | f <sub>ref</sub> | P |
| DI1 | Start forward    | P |
| DI2 | Start reverse    | P |
| DI3 | External fault   | P |
| DI4 | Speed select 1   |   |
| DI5 | Speed select 2   |   |
| DI6 | Speed select 3   |   |
| A01 | f <sub>out</sub> | P |
| D01 | Ready            | P |
| R01 | Run              | P |
| R02 | Fault            | P |

16 fixed speeds

### PID Control

| I/O | Defaults          |   |
|-----|-------------------|---|
| A11 | PID reference     | P |
| A12 | PID actual value  | P |
| DI1 | PID start/stop    |   |
| DI2 | External fault    | P |
| DI3 | Fault reset       | P |
| DI4 | f ctrl start/stop |   |
| DI5 | Jog speed select  | P |
| DI6 | PID/f ctrl select |   |
| A01 | f <sub>out</sub>  | P |
| D01 | Ready             | P |
| R01 | Run               | P |
| R02 | Fault             | P |

When PID is required

### Multi-purpose Control

| I/O | Defaults         |   |
|-----|------------------|---|
| A11 | f <sub>ref</sub> | P |
| A12 | f <sub>ref</sub> | P |
| DI1 | Start forward    | P |
| DI2 | Start reverse    | P |
| DI3 | Fault reset      | P |
| DI4 | Jog speed sel    | P |
| DI5 | External fault   | P |
| DI6 | Acc/dec time sel | P |
| A01 | f <sub>out</sub> | P |
| D01 | Ready            | P |
| R01 | Run              | P |
| R02 | Fault            | P |

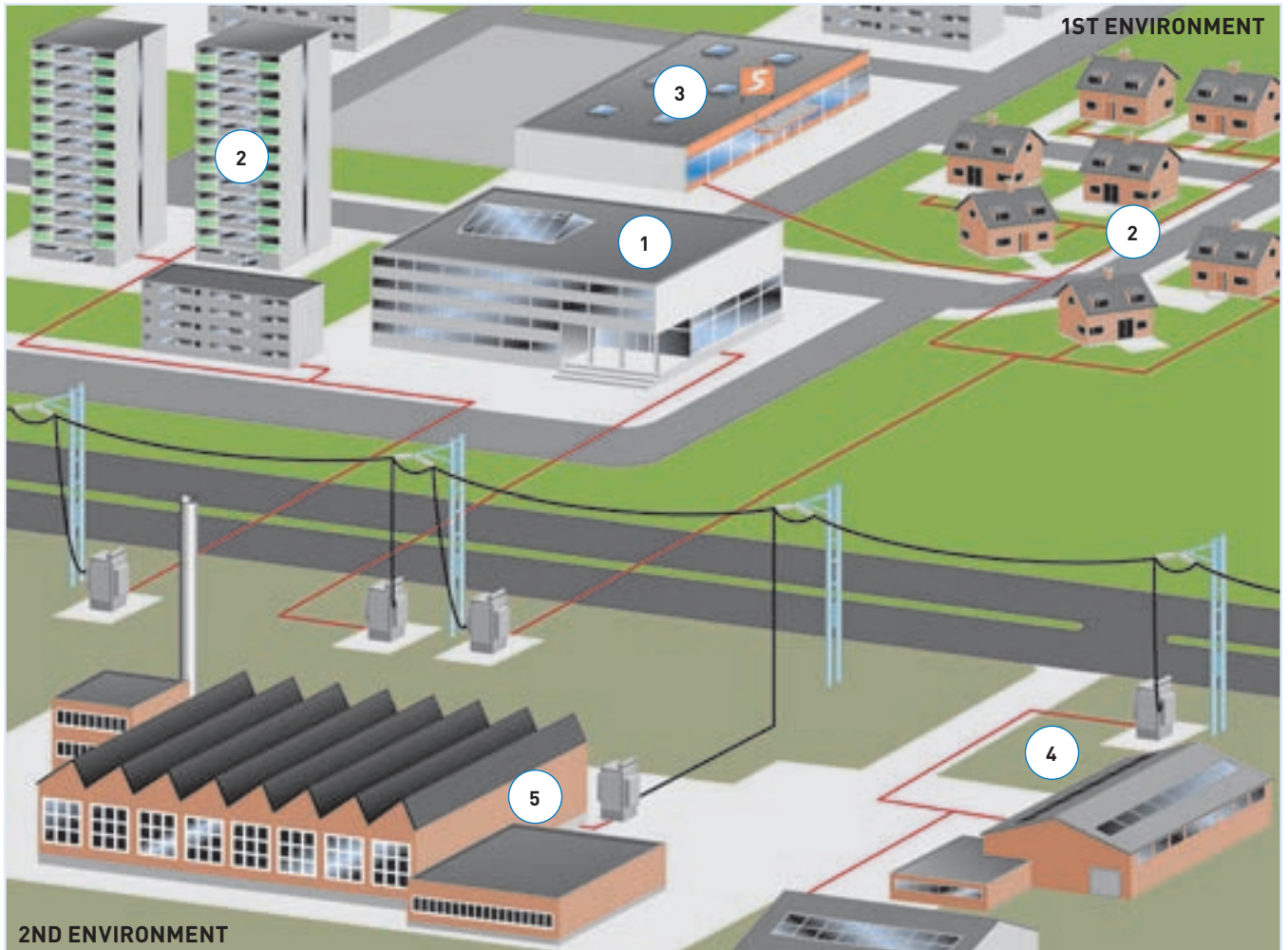
Most flexible of all

### Pump and Fan Control

| I/O | Defaults          |   |
|-----|-------------------|---|
| A11 | PID reference     | P |
| A12 | PID actual value  | P |
| DI1 | PID start/stop    | P |
| DI2 | Interlock 1       | P |
| DI3 | Interlock 2       | P |
| DI4 | f ctrl start/stop | P |
| DI5 | Jog speed select  | P |
| DI6 | PID/f ctrl select | P |
| A01 | f <sub>out</sub>  | P |
| D01 | Fault             | P |
| R01 | Autochange 1      | P |
| R02 | Autochange 2      | P |

Control of up to five pumps with auto-change

# EMC AND INSTALLATION ENVIRONMENT



The product family standard EN61800-3 sets limits for both emissions and immunity of radio frequency disturbances. The environment has been divided into the 1st and 2nd environments, i.e. in practice, the public and industrial networks, respectively.

Radio Frequency Interference (RFI) filters are typically required to meet the EN61800-3 standard. These filters are integrated in the Vacon NXS as standard.

The 208–240 V and 380–500 V ranges of the Vacon NXS (FR4-FR9) fulfills the requirements of the 1st and 2nd environments (H level: EN61800-3(2004), category C2). No additional RFI filters or cabinets are required. The FR10-FR11 and the 525-690 V range of the Vacon NXS fulfills the requirements of the 2nd environment (L-level: EN61800-3(2004), category C3).

The units in the frame sizes of FR4, FR5 and FR6 (the voltage range from 380 to 500 V) are also available with extremely low-emission integrated EMC filters (C level: EN61800-3 (2004), category C1). This is sometimes required in very sensitive locations such as hospitals.

## EMC Selection Table, restricted distribution

|               | 1        | 2                | 3          | 4                   | 5              |                |
|---------------|----------|------------------|------------|---------------------|----------------|----------------|
| Vacon NXS EMC | Hospital | Residential Area | Commercial | Light Industry Area | Heavy Industry | Marine         |
| C             | O        |                  |            |                     |                |                |
| H             | R        | R                | R          | O                   | O              |                |
| L             |          |                  |            | R                   | R              |                |
| T             |          |                  |            |                     | R (IT Network) | R (IT Network) |

R = Required ; O = Optional

|   |  |   |
|---|--|---|
| <b>Mains connection</b>                                 | Input voltage $U_{in}$                                       | 208...240 V; 380...500 V; 525...690 V; (-15%...+10%)  |
|   | Input frequency  | 50...60 Hz ( $\pm 10\%$ )   |
|   | Connection to mains  | Once per minute or less (normal case)   |
| <b>Motor connection</b>                                 | Output voltage   | $0-U_{in}$  |
|   | Continuous output current                                    | High overloadability: $I_H$<br>Low overloadability: $I_L$   |
|   | Overloadability  | High: $1.5 \times I_H$ (1 min/10 min), Low: $1.1 \times I_L$ (1 min/10 min)   |
|   | Max. starting current  | $I_s$ for 2 s every 20 s  |
|   | Output frequency   | 0...320 Hz; up to 7200 Hz with special software   |
|   | Frequency resolution   | 0.01 Hz   |
| <b>Control characteristics</b>                          | Control method   | Frequency control U/f; Open Loop Vector Control (speed, torque)   |
|   | Switching frequency  | 208..240V/380..500V: FR4-6: 1...16 kHz; Factory default: 10 kHz<br>FR7-9: 1...10 kHz; Factory default: 3.6 kHz<br>FR10-11: 1...6 kHz; Factory default: 3.6 kHz<br>525..690V: FR4-11: 1...6 kHz, Factory default: 1.5 kHz  |
|   | Field weakening point  | 8...320 Hz  |
|   | Acceleration time  | 0...3000 sec  |
|   | Deceleration time  | 0...3000 sec  |
|   | Braking  | DC brake: $30\% * T_N$ (without brake resistor), flux braking   |
| <b>Ambient conditions</b>                               | Ambient operating temperature                                | -10°C (no frost)...+50°C: $I_H$ (FR10-FR11: max +40°C)<br>-10°C (no frost)...+40°C: $I_L$ (NXS 0416 6 and NXS 0590 6: max +35°C)  |
|   | Storage temperature  | -40°C...+70°C   |
|   | Relative humidity  | 0 to 95% RH, non-condensing, non-corrosive, no dripping water   |
|   | Air quality:<br>- chemical vapours<br>- mechanical particles | IEC 60721-3-3, unit in operation, class 3C2<br>IEC 60721-3-3, unit in operation, class 3S2  |
|   | Altitude   | 100% load capacity (no derating) up to 1000 m<br>1-% derating for each 100 m above 1000 m; max. 3000 m  |
|   | Vibration<br>EN50178/EN60068-2-6                             | 5...150 Hz: Displacement amplitude 1 mm (peak) at 5...15.8 Hz<br>(FR10-FR11: 0,25 mm (peak) at 5...31 Hz)<br>Max acceleration amplitude 1 G at 15.8...150 Hz (FR10 and up: 1 G at 31...150 Hz)  |
|   | Shock<br>EN50178, EN60068-2-27                               | UPS Drop Test (for applicable UPS weights)<br>Storage and shipping: max 15 G, 11 ms (in package)  |
|   | Enclosure class  | IP21 and IP54   |
| <b>EMC</b>  | Immunity   | Fulfil all EMC immunity requirements  |
|   | Emissions  | <b>EMC level C:</b> EN61800-3 (2004), category C1<br><b>EMC level H:</b> EN61800-3 (2004), category C2<br><b>EMC level L:</b> EN61800-3 (2004), category C3<br><b>EMC level T:</b> Low earth-current solution suitable for IT networks, EN61800-3 (2004), category C4 |
| <b>Safety</b>   |  | EN 50178 (1997), EN 60204-1 (2006), IEC 61800-5, CE, UL, CUL;<br>[see unit nameplate for more detailed approvals]   |
| <b>Control connections (OPT-A1, -A2 or OPT-A1, -A3)</b> | Analogue input voltage                                       | 0...+10 V [-10 V...+10 V joystick control], $R_i = 200 \text{ k}\Omega$ , resolution 0.1%, accuracy $\pm 1\%$   |
|   | Analogue input current                                       | 0(4)...20 mA, $R_i = 250 \text{ }\Omega$ differential, resolution 0.1%, accuracy $\pm 1\%$  |
|   | Digital inputs   | 6, positive or negative logic; 18...30 VDC  |
|   | Auxiliary voltage  | +24 V, $\pm 15\%$ , max. 250 mA   |
|   | Output reference voltage                                     | +10 V, +3%, max. load 10 mA   |
|   | Analogue output  | 0(4)...20 mA; $R_L$ max. 500 $\Omega$ , resolution 10 bit, accuracy $\pm 2\%$   |
|   | Digital output   | Open collector output, 50 mA/48 V   |
|   | Relay outputs  | 2 programmable change-over (NO/NC) relay outputs (OPT-A3: NO/NC+NO)<br>Switching capacity: 24 VDC/8 A, 250 VAC/8 A, 125 VDC/0.4 A. Min. switching load: 5 V/10 mA   |
| Thermistor input (OPT-A3)                               | Galvanically isolated, $R_{trip} = 4.7 \text{ k}\Omega$      |   |
| <b>Protections</b>                                      |  | Overvoltage, undervoltage, earth fault, mains supervision, motor phase supervision, overcurrent, unit overtemperature, motor overload, motor stall, motor underload, short-circuit of +24 V and +10 V reference voltages  |



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