VACON® NX
AC DRIVES

DC/DC CONVERTER OPERATING GUIDE

VACON®

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NOTE! You can download the English and French product manuals with applicable safety, warning and caution information from http://drives.danfoss.com/knowledge-center/technical-documentation/.

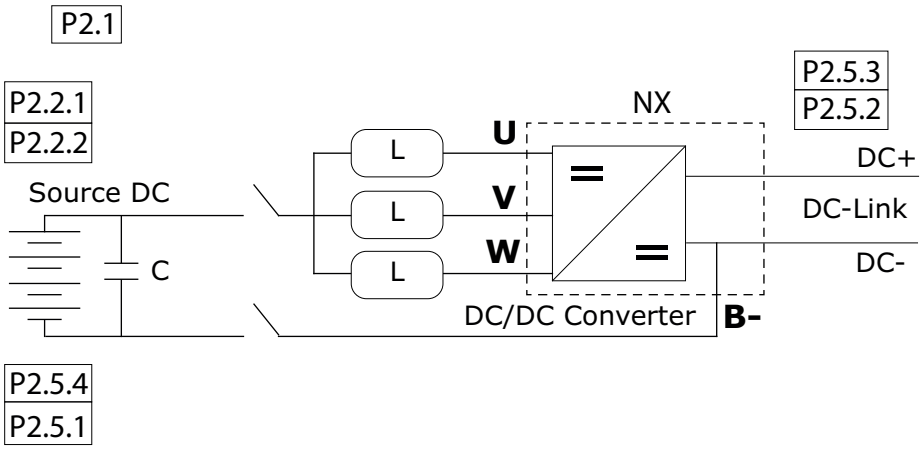
REMARQUE Vous pouvez télécharger les versions anglaise et française des manuels produit contenant l'ensemble des informations de sécurité, avertissements et mises en garde applicables sur le site http://drives.danfoss.com/knowledge-center/technical-documentation/ .

1. INTRODUCTION

The DC/DC application creates output according to the needs of the system, and it is possible to integrate into the system with different topologies. Choosing applicable topology, see the Design Guide, Hybridization (DPD01887A).

1.1 APPLICATION FUNCTIONALITY

DC-link side	Controlled source side	
Control	**Control**	**Limit**
Under voltage	Voltage	Voltage
Over voltage	Current	Current



Reference	Parameter
P2.1	Basic parameters
P2.2.1	Voltage reference
P2.2.2	Current reference
P2.5.1	Current limit
P2.5.2	Under voltage control for DC-link voltage
P2.5.3	Over voltage control for DC-link voltage
P2.5.4	Source voltage

Figure 1. DC/DC connection

For more detailed parameter information, see Chapter 2 "Parameters".

1.2 CONNECTION

Connect the phase cables (U, V and W) and cable B-/DC- to correct terminals. See Figure 2, "FR4-FR9 main terminals," on page 3, Figure 3, "CH62 main terminals," on page 4, Figure 4, "FI4-FI10 basic wiring diagrams," on page 5 and Figure 5, "2 x FI10 basic wiring diagram," on page 6.

NOTE: The connection varies according to drive. Always check the connection terminals from the instruction manual of the drive in question. E.g. in FR4-FR6 INU devices (FI4-FI6) B- = DC-.

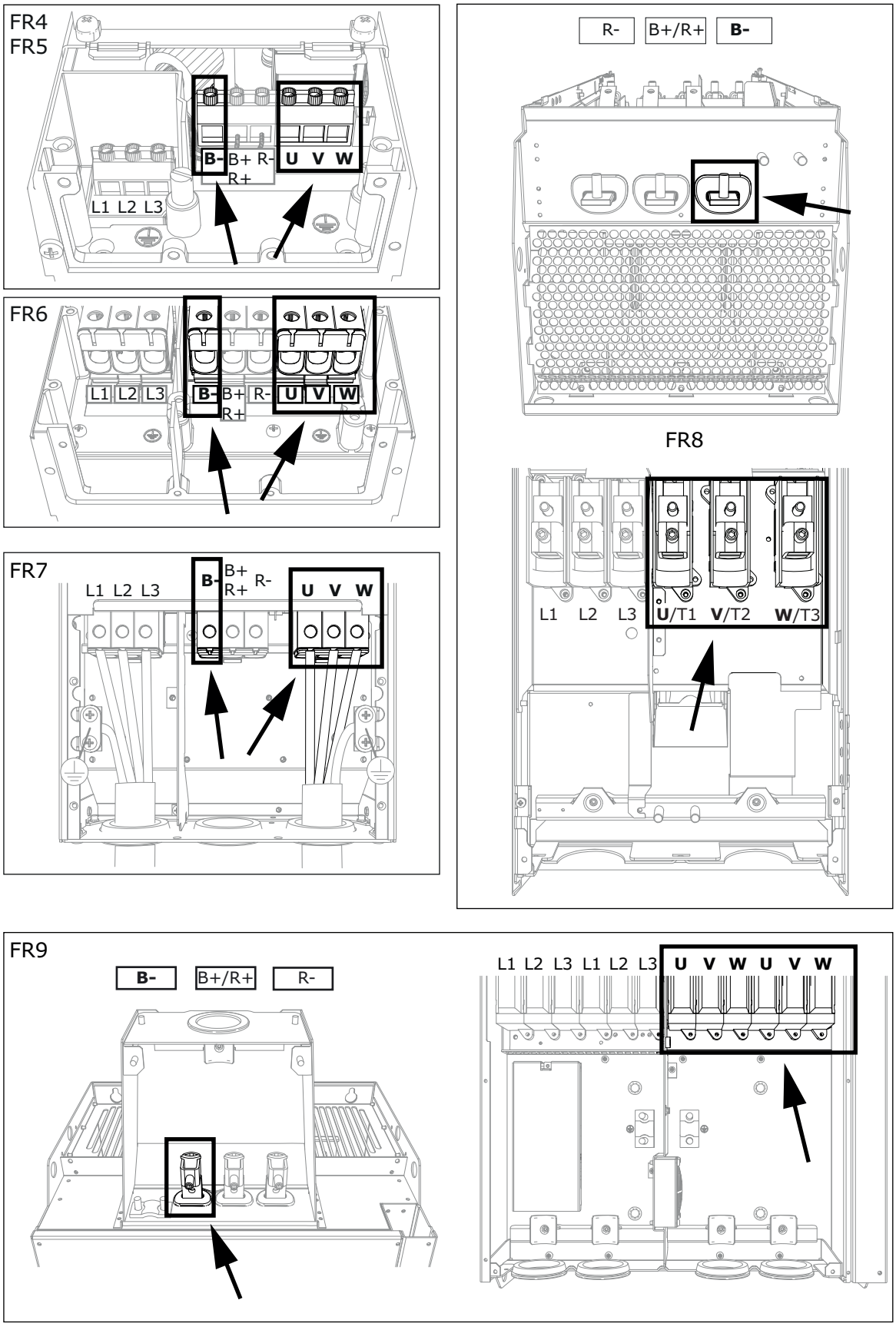


Figure 2. FR4-FR9 main terminals

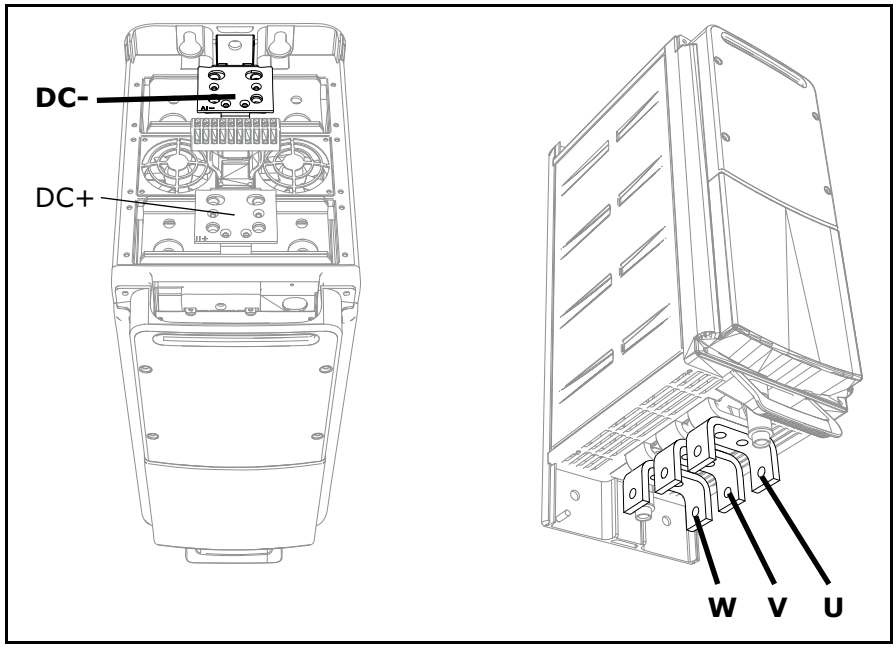


Figure 3. CH62 main terminals

Local contacts: http://drives.danfoss.com/danfoss-drives/local-contacts/

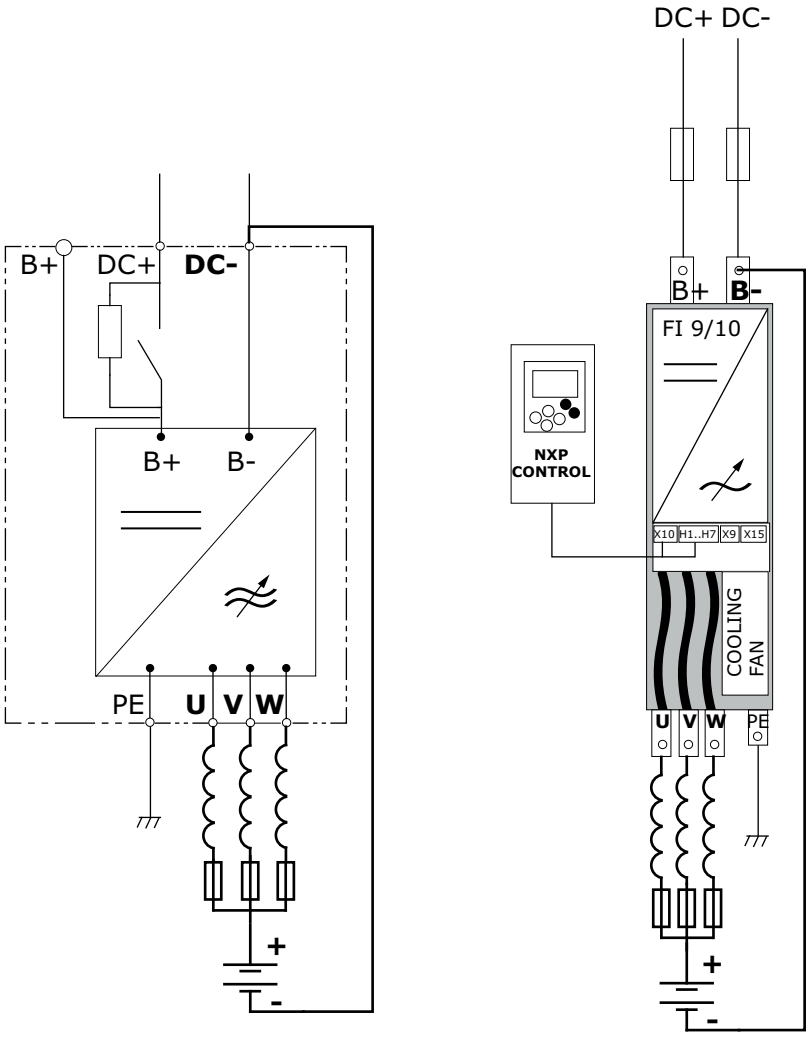


Figure 4. FI4-FI10 basic wiring diagrams

NOTE: The location and selection of fuses varies according to system design.

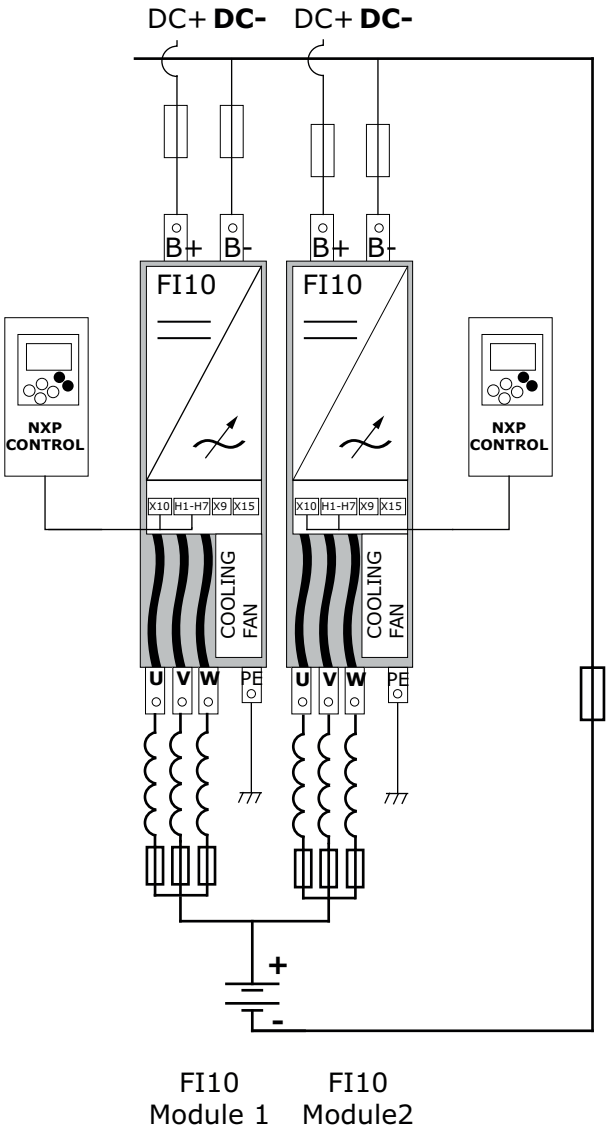


Figure 5. 2 x FI10 basic wiring diagram

NOTE: The location and selection of fuses varies according to system design.

Local contacts: http://drives.danfoss.com/danfoss-drives/local-contacts/

2. PARAMETERS

2.1 SOURCE SIDE PARAMETERS

2.1.1 BASIC PARAMETERS

Table 1. Basic parameters

Code	Parameter	Min	Max	Unit	Default	ID	Note
P2.1.1	Source Nom Current	0.0	Varies	A	Varies	113	Capacity of supply
P2.1.2	Source Nom Voltage	200	1099	V	Varies	110	
P2.1.3	Source Nom Power	0	32000	kW	0	116	
P2.1.4	Control Mode	0	1		0	1858	**0** = Current **1** = Voltage
P2.1.5	Identification	0	1		0	631	**0** = No Action **1** = Current, Meas, Offset

P2.1.1 SOURCE NOM CURRENT ID113

This parameter defines the current value that is used as the 100 % current for e.g. charging current limit.

P2.1.2 SOURCE NOM VOLTAGE ID110

This parameter defines the absolute voltage value that is used as the 100 % voltage for e.g. the voltage reference.

P2.1.3 SOURCE NOM POWER ID116

This parameter is used for scaling the percentage power monitoring value.

P2.1.4 CONTROL MODE ID1858

This parameter is used to select the control mode of the drive.

0 = Current control mode

1 = Voltage control mode

P2.1.5 IDENTIFICATION ID631

This parameter is used to calibrate the current measurement.

0 = No Action

1 = Current measurement offset

When the identification is finished, the drive must be connected to the battery system or the used DC power source. There should also not be any load on the DC-link.

Select the identification run and give the DC/DC converter a start command within 20 seconds after the identification mode is selected.

2.1.2 VOLTAGE REFERENCE

Table 2. Voltage reference handling

Code	Parameter	Min	Max	Unit	Default	ID	Note
P2.2.1.1	Voltage Reference	0	320	%	100	1462	
P 2.2.1.2	Drooping	0	100	%	0	620	
P 2.2.1.3	Voltage Reference Ramp Rate	-1	320	%/s	5	1867	
P2.2.1.4	Voltage Reference At Start	0	2		3	1864	**0** = Reference **1** = Start Voltage Reference **2** = Measurement **3** = 80%
P2.2.1.5	Start Voltage Reference	0	320	%	90	1865	

P2.2.1.1 DC VOLTAGE REFERENCE ID1462

Voltage reference in percentage of Source Nom Voltage.

P2.2.1.2 DROOPING ID620

Voltage reference drooping. Used when parallel DC-DC converters are used.

P2.2.1.3 REACTIVE CURRENT REFERENCE SOURCE SELECTION ID1867

Voltage reference ramp rate in in percentage or in seconds.

P2.2.1.4 VOLTAGE REFERENCE AT START ID1864

This parameter is used to define how the voltage reference starting value is handled in a start. The start will be smoother when the value is close to the actual source voltage.

0 = Reference

Starting voltage is a directly given reference P2.2.1.1 Voltage Reference.

1 = V Ref Start

Starting voltage is defined by parameter P2.2.1.5 Start Voltage Reference and ramped to actual reference with set ramp rate.

2 = Measurement

Starting voltage is taken from measured voltage V1.12.11 Voltage Meas. ID1866. This monitoring value can be written by analogue ID function or from fieldbus.

3 = 80 %

Drive will start as an initial guess of 80% of source voltage.

P2.2.1.5 START VOLTAGE REFERENCE ID1865

The voltage value that is used for the initial start voltage when P2.2.1.4 Voltage Reference At Start is 1 / V Ref Start.

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2.1.3 CURRENT REFERENCE

Table 3. Current reference handling

Code	Parameter	Min	Max	Unit	Default	ID	Note
P2.2.2.1	Current Reference	-150	150	%	0	1860	Common reference for all phases.
P 2.2.2.2.1	Phase Reference Mode	0	1		0	1859	**0** = Common **1** = Individual
P 2.2.2.2.2	IU Current Reference	-300	300	%	0	128	
P2.2.2.2.3	IV Current Reference	-300	300	%	0	129	
P2.2.2.2.4	IW Current Reference	-300	300	%	0	130	

P2.2.2.1 CURRENT REFERENCE ID1860

The active current reference of the drive in percentage of Source Nominal Current.

Active Curr. Ref > 0: Current flow from drive DC-Link to source.

Active Curr. Ref < 0: Current flow from source to drive DC-Link.

P2.2.2.2.1 PHASE REFERENCE MODE ID1859

This parameter is used to select if the same current reference is used for all phases or if the current is controlled individually.

0 = Common

P: Current reference is used for all phases.

1 = Individual phase control

Each phase is controlled separately with G2.2.2.2 parameters.

Used when each phase have a separate DC source.

P2.2.2.2.2 IU CURRENT REFERENCE ID128

The U phase current reference on an individual mode.

P2.2.2.2.3 IV CURRENT REFERENCE ID129

The V phase current reference on an individual mode.

P2.2.2.2.4 IW CURRENT REFERENCE ID130

The W phase current reference on an individual mode.

2.1.4 SOURCE VOLTAGE

Table 4. Source voltage

Code	Parameter	Min	Max	Unit	Default	ID	Note
P2.5.4.1	Source min voltage	50.0	1100.0	Vdc	200/345	1893	Discharge limit
P2.5.4.2	Source max voltage	50.0	1100.0	Vdc	749/1099	1895	Charge limit
P2.5.4.3	Source voltage hysteresis	0.0	100.0	Vdc	5.0	1896	

P2.5.4.1 SOURCE MIN VOLTAGE ID1893

If Source DC voltage reaches this minimum value, discharging is disabled.

P2.5.4.2 SOURCE MAX VOLTAGE ID1895

If Source DC voltage reaches this maximum value, charging is disabled.

P2.5.4.3 SOURCE VOLTAGE HYSTERESIS ID1896

The hysteresis for the limiting functions.

2.1.5 CURRENT LIMIT

Table 5. Current limit

Code	Parameter	Min	Max	Unit	Default	ID	Note
P2.5.1.1	Current Limit	0	Varies	A	Varies	107	Total current limit
P2.5.1.2	Charging Limit	0	300	%	105	1290	A percentage of nom current
P2.5.1.2	Discharging Limit	0	300	%	105	1289	A percentage of nom current

P2.5.1.1 CURRENT LIMIT ID107

Current limit in amperes.

P2.5.1.2 CHARGING LIMIT ID1290

The charging current limit in percentage of Source Nom Current.

P2.5.1.3 DISCHARGE LIMIT ID107

The discharging current limit in percentage of Source Nom Current.

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2.2 DC-LINK SIDE PARAMETERS

2.2.1 OVER VOLTAGE CONTROL FOR DC-LINK VOLTAGE

Table 6. Over voltage control for DC-link voltage

Code	Parameter	Min	Max	Unit	Default	ID	Note
P 2.5.3.1	Over voltage reference	0	320	%	118	1528	A percentage of unit nominal DC-Link voltage. 500 Vac unit: 675 Vdc 690 Vac unit: 931 Vdc
P 2.5.3.2	Over voltage droop	0	100	%	0	1862	

P2.5.3.1 OVER VOLTAGE REFERENCE ID1528

The over voltage reference in percentage of Nominal DC Voltage of the drive.

P2.5.3.2 OVER VOLTAGE DROOP ID1862

The over voltage reference drooping. The set drooping is reached when the active current is 100%.

2.2.2 UNDER VOLTAGE CONTROL FOR DC-LINK VOLTAGE

Table 7. Under voltage control for DC-link voltage

Code	Parameter	Min	Max	Unit	Default	ID	Note
P 2.5.2.1	Under Voltage Reference	0	320	%	65	1567	A percentage of nominal DC-Link voltage. 500 Vac unit: 675 Vdc 690 Vac unit: 931 Vdc
P 2.5.2.2	Under Voltage Droop	0	100	%	0	1863	

P2.5.2.1 UNDER VOLTAGE REFERENCE D1567

The under voltage reference in percentage of Nominal DC Voltage of the drive.

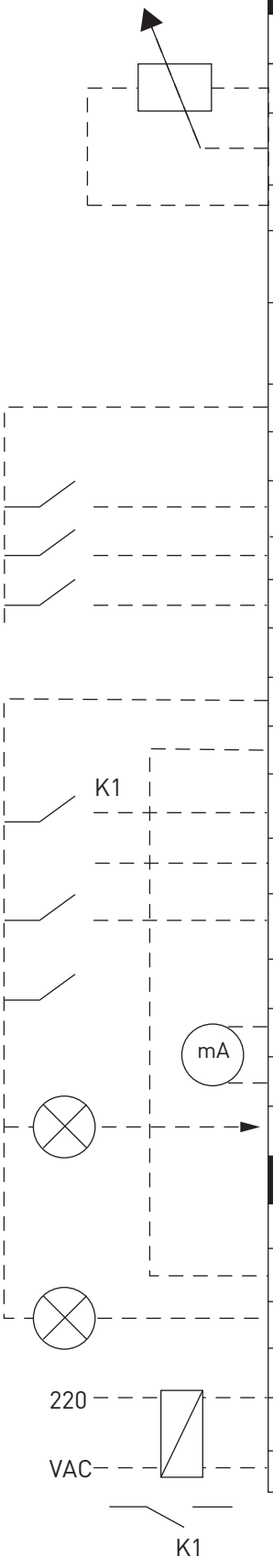
P2.5.2.2 UNDER VOLTAGE DROOP ID1863

The under voltage reference drooping. The set drooping is reached when the active current is 100%.

NOTE: For more detailed parameter information, see the Vacon NX Programming Guide (DPD01886A).

3. CONTROL I0

Table 8. Default I/O configuration



NXOPTA1			
Terminal		**Signal**	**Description**
1	+10 Vref	Reference voltege output	Voltege for potentiometer, etc.
2	AI1+	Analogue input 1. Range 0-10V, R_i= 200Ω Range 0-20 mA, R_i= 250Ω	Analogue input 1Input range selected by jumpers. Default range: Voltage 0–10 V
3	AI1-	I/O ground	Ground for reference and controls
4	AI2+	Analogue input 2. Range 0-10V, Ri= 200Ω Range 0-20 mA, Ri= 250Ω	Analogue input 2 Input range selected by jumpers. Default range: Current 0 – 20 mA
5	AI2-		
6	+24V	Control voltage output	Voltage for switches, etc. max 0.1 A
7	GND	I/O ground	Ground for reference and controls
8	DIN1	Start Request Programmable G2.3.1	Contact closed = Start Request
9	DIN2	Programmable G2.3.1	No function defined at default
10	DIN3	Fault reset Programmable G2.3.1	Rising edge will reset active faults.
11	CMA	Common for DIN 1—DIN 3	Connect to GND or +24V
12	+24V	Control voltage output	Voltage for switches (see #6)
13	GND	I/O ground	Ground for reference and controls
14	DIN4	Programmable G2.3.1	Contact closed = MCC Closed
15	DIN5	Programmable G2.3.1	No function defined at default
16	DIN6	Programmable G2.3.1	No function defined at default
17	CMB	Common for DIN4—DIN6	Connect to GND or +24V
18	AOA1+	Analogue output 1 Programmable P2.3.1	Output range selected by jumpers. Range 0—20 mA. R_L, max. 500Ω Range 0—10 V. R_L > 1kΩ
19	AOA1-		
20	DOA1	Digital output Ready / Warning (Blinking)	Programmable Open collector, I≤50mA, U≤48 VDC
NXOPTA2			
21	RO 1	Relay output 1 Programmable G2.4.1	Switchin capacity 24 VCD / 8 A 250 VAC / 8 A 125 VDC / 0.4 A
22	RO 1		
23	RO 1		
24	RO 2	Relay output 2	
25	RO 2		
26	RO 2		

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