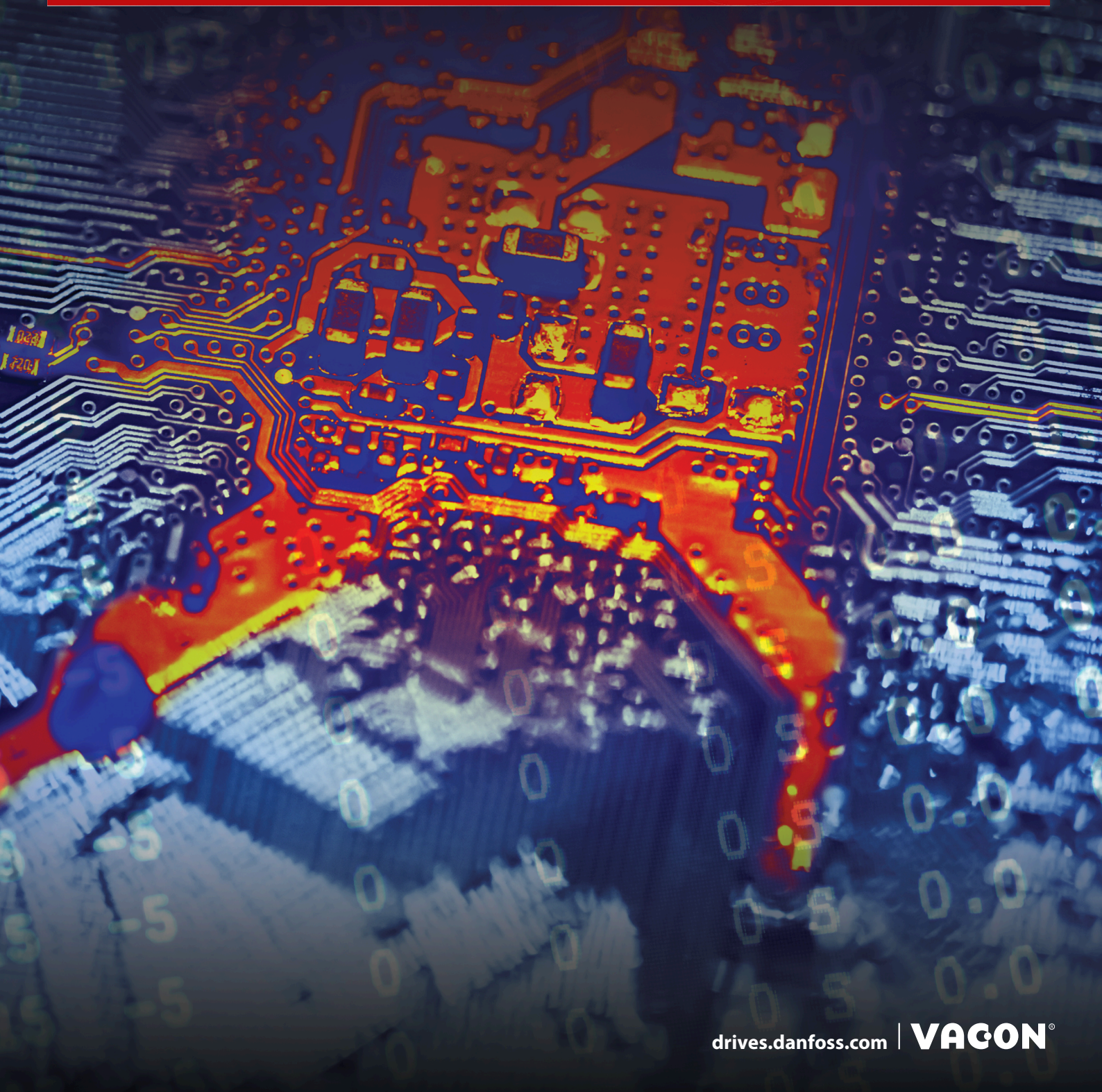
ENGINEERING TOMORROW

Operating Guide

Line Voltage Measurement

VACON® NX AC Drives OPTD7 Option Board



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1 Introduction

1.1 Purpose of the Operating Guide

This operating guide provides the information on the VACON® NX Line Voltage Measurement OPTD7 Option Board used in VACON® NXP drives. It is intended for qualified personnel.

Read and follow the instructions to use the drive safely and professionally.

1.2 Additional Resources

Other resources are available to understand advanced AC drive functions and programming.

- The VACON® NX manuals provide greater detail on working with parameters and show many application examples.
- The VACON® NX I/O Boards User Manual gives more information on the I/O boards and their installation.
- Instructions for operation with option boards and other optional equipment.

Supplementary publications and manuals are available from Danfoss.

1.3 Disposal

Do not dispose of equipment containing electrical components together with domestic waste. Collect it separately in accordance with local and currently valid legislation.

2 Product Overview

2.1 Intended Use

OPTD7 is an AC sinusoidal voltage measurement option board used in VACON® NXP drives. VACON® NXP drive measures the line voltage, frequency and voltage angle information using this board. VACON® NXP can compare this information with its output voltage angle when it is running. This feature can be used to develop applications for different purposes using NC61131-3 application programming tool.

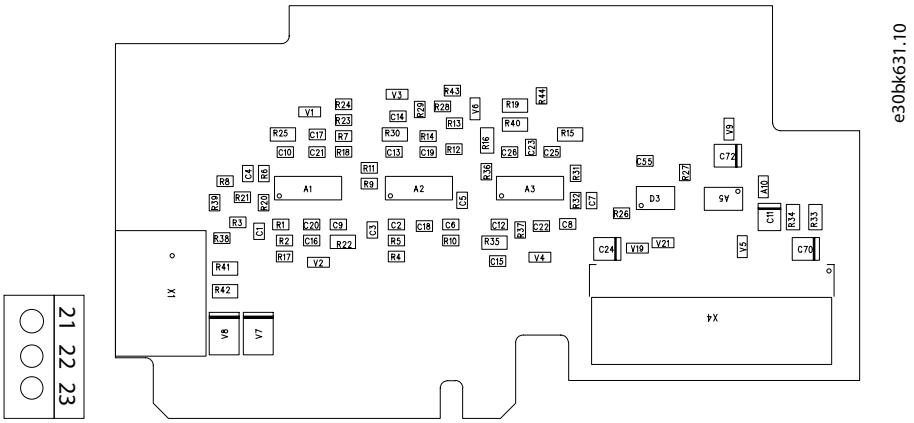

Illustration 1: OPTD7 Option Board Layout

The OPTD7 option board is delivered with the transformer which is suitable for voltage range 380-690 V.

Illustration 2: Transformer

NOTE! The transformer can not be used with the pulse width modulated (PWM) voltage input.

It is possible to use custom built transformer when the input voltage to be measured is not within the voltage range 380-690 V. The transformation ratio parameter can be adjusted as per the transformer primary to secondary ratio. Please refer to specification section for more information.

N O T I C E

The measurement signal connected into the OPTD7 option board can not exceed 14.26 Vrms.

The OPTD7 option board can only be used in slot C of VACON® NXP drive.

Type ID: VB00379

2.2 Specification

Table 1: OPTD7 Option Board (VB00379 based on revision X)

Technical item or function	Technical data	Description
Transformer primary/input voltage range	Min 380 V AC -15% Max 690 V AC +15%	
Transformer ratio primary:secondary	60:1	
Transformer secondary/output voltage range	14 V rms	Between the terminals L1/L2/L3
Input impedence	L1/L2 = 50 kΩ L1/L3 = 25 kΩ L2/L3 = 25 kΩ	L3 is internal virtual common
Cable recommendation	Max 1.5 mm^2, shielded	From transformer output to OPTD7 option board
Measurement resolution	10 bit	
Voltage measurement accuracy	0.2%	For D7 board measurement, transformer not included
Frequency measurement accuracy	Accuracy: <10 mHz Resolution: 10 mHz	In frequency range 45-65 Hz

3 OPTD7 Option Board Menu

3.1 Parameters

- Transformer ratio: Transfer ratio of the measurement transformer.
- Default value: 60.00(690 V/11.5 V)

In case using other measurement transformers than the one supplied with the board, the voltage measurement shows correct numbers by setting the transformer ratio right.

3.2 Monitoring

- Line voltage: Main voltage
- Line frequency: Main frequency(including sign)

4 Application Examples

4.1 Line Synchronization

Features:

- Frequency and phase angle synchronization between VACON® NXP drive and mains supply. Thus smooth Direct On Line (DOL) transfer of motor to the mains is possible with minimal peak current from the mains supply.
- External synchronizer is not required.
- Smooth transfer back to inverter with fast catch on fly feature.
- Changeover activation possible through either I/O, fieldbus or keypad.
- Compensation parameters for the changeover circuit delay and offset angle to the synchronization.
- Indication for 'Line Synch OK' programmable to digital outputs.
- Mains voltage and frequency monitoring on keypad and PC tool.
- Applicable to any size of LV (low voltage) motor and MV (medium voltage) motor through step up transformer.
- OPTD7 option board is used for mains supply voltage measurement as shown in Illustration 3.

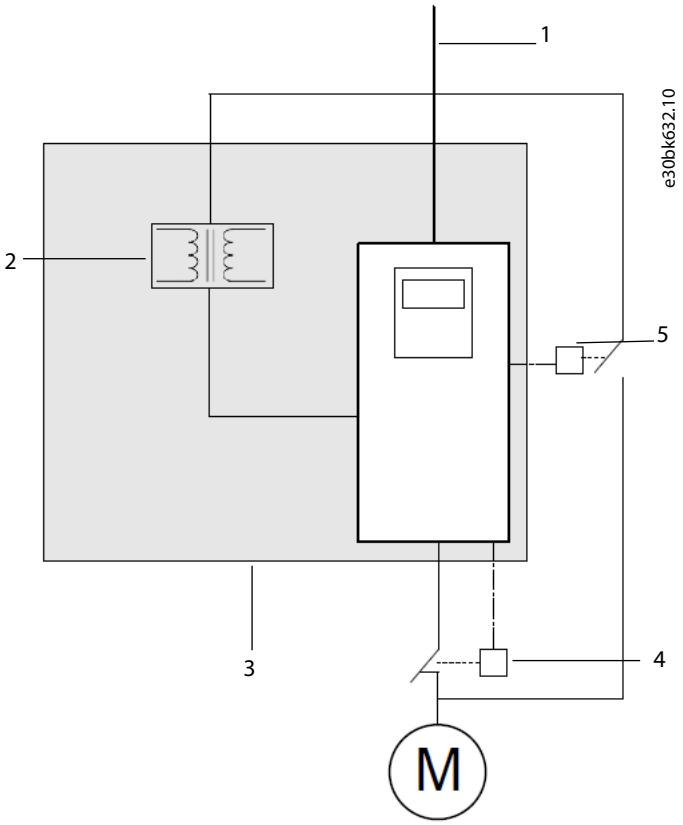

Illustration 3: Block Diagram for Direct ON Line Transfer of Motor

1	Mains supply	4	Drive contactor
2	Measurement transformer	5	Bypass contactor
3	VACON AC drive		

See Illustration 4 for the connection diagram example for OPTD7 option board and voltage transformer in Line Synchronization applications.

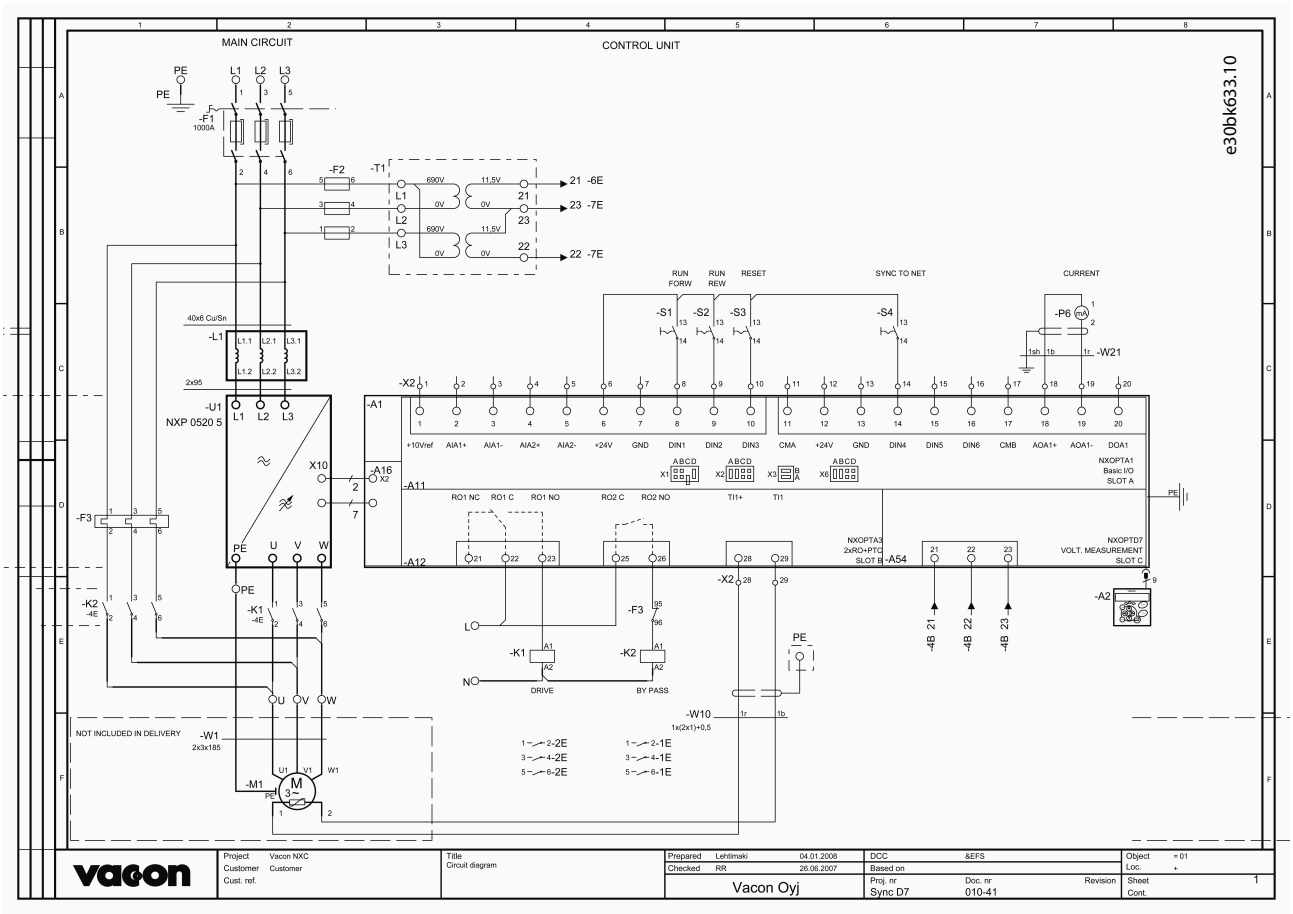

Illustration 4: Connection in Line Synchronization Applications

4.2 Fundamental Front End (NXF)

OPTD7 option board is used to feedback the main supply voltage and frequency with VACON® NXF, fundamental front end. Fundamental front end is IGBT based regenerative supply unit. It is used to supply one or multiple inverters in a common DC bus system.

For more details, please refer to www.danfoss.com or contact Danfoss Sales Support.

See the connection of OPTD7 option board and voltage transformer in FFE applications in Illustration 5.

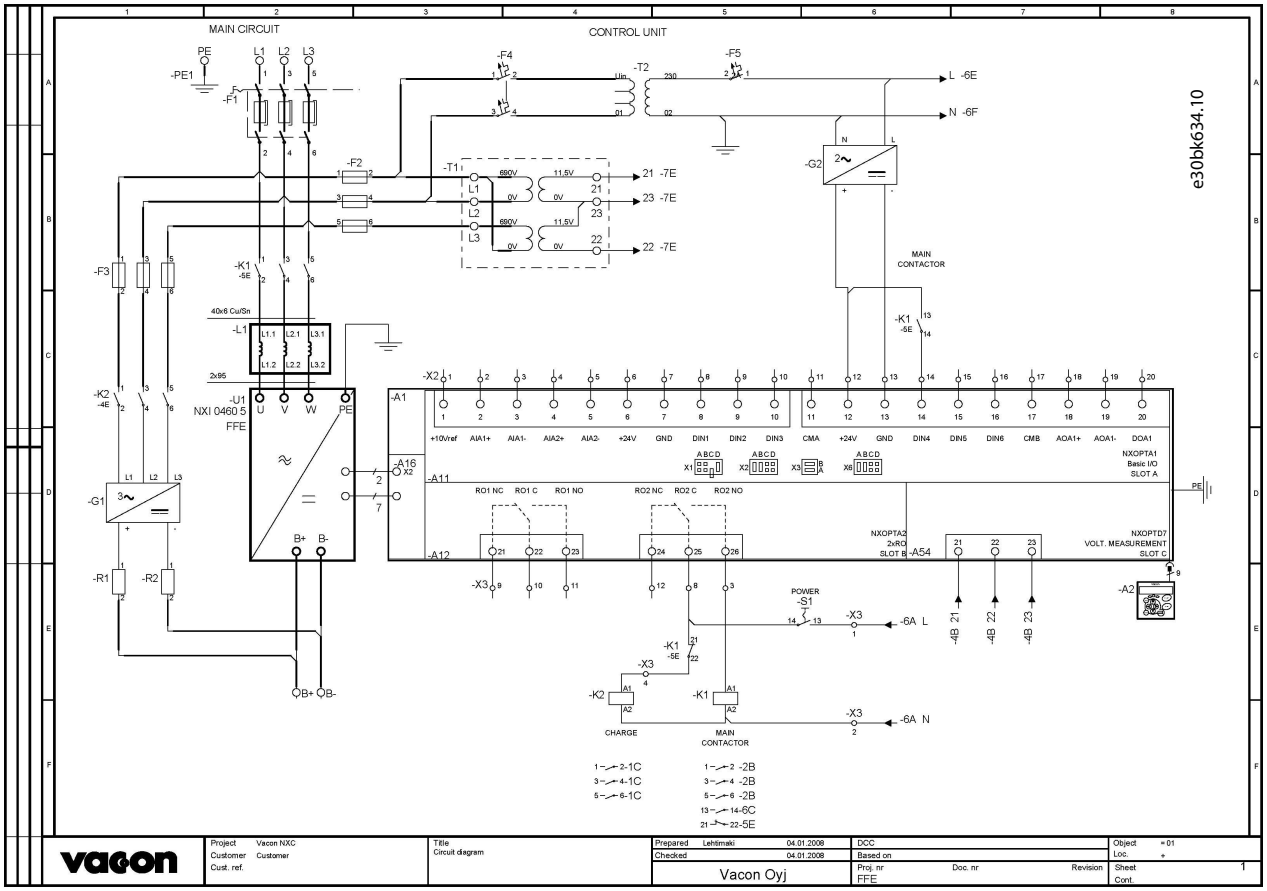

Illustration 5: Connection in FFE Applications

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