



NX FREQUENCY CONVERTERS

VACON NX APPLICATIONS

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VACON NX APPLICATIONS

1. GENERAL

This document lists and describes the NX applications made by Vacon Plc. The purpose of this document is to show Vacon personnel within sales, marketing and other departments, what kind of applications have already been developed. This will help them to offer a correct solution for the customer.

Most of the applications can be found from our web pages, but some of them are not downloadable from web. In those cases application software's and documents must be always requested from Application software team (application.team@vacon.com). In most cases they are not available for Factory orders by ID number.

Applications made for OEM customers and customer-specific applications are not usually mentioned in this document.

Following information has been describes from each application.

First is the numbered heading that shows the Application ID. Application code instead of name should be always used when applications are ordered. After the heading there is a short description of the application, and then some DATA.

DATA includes:

UD -code for manual,

Publicity level:

Intranet (www.vacon.com), also available as preloaded from factory

Extranet (www.sw.vacon.com), also available as preloaded from factory

Customer Specific (Usually not available for public use)

InHouse (Available by request from Application team)

Under Development (Check availability from Application team)

Base application (Which application is used as base for this new application)

If a License Key is required

Application Segment

General

PFC

Conveyour

Hoisting

Elevators

Pulp and paper

Metals

Textile

Common DC bus product

Applications other than Motor control

2. DRIVE TYPE / SEGMENT

Product \ Segment	General	Pump and Fan Control (PFC)	Hoisting and Elevators	Pulp and Paper	Metals	Textile	Motion Control	Application which does not control Motor
NXP	x	x	x	x	x	x	x	x
NXS	x	x	x	x	x	x		x
NXL	x	x	x					
Common DC bus Products (NXA, NXR, NXF, NXN, NXB, NXI)	x	x	x	x	x	x	x	X

3. NXL APPLICATIONS

3.1 ALFIF127 Sliding door application

Description:

This special application is based on NXL Multi-Control application. PID, PFC and some other small features are removed. This NXL-application is designed to control the motor, which drives the lift door.

Frequency converter also gives some status information to the lift controller via relay/digital output. (e.g. torque limit supervision.)

Data:

Application ID:	ALFIF127
Manual:	UD00880
Publicity level:	Extranet
Base application:	ALFIF25
Segments:	General, Elevators

3.2 ALFIF128 Actual value difference

Description:

In this application is it possible to use the difference between AI1 and AI2 as actual value for the PID regulator.

Data:

Application ID:	ALFIF128
Manual:	NA
Publicity level:	InHouse
Base application:	ALFIF20
Segment:	General, PFC

3.3 ALFIFF25 NXL Application Template

Description:

This is NXL Multicontrol application without PID and PFC control. This application can be used as a base application for NXL special applications development. PID and PFC functions are removed to get more memory space.

Data:

Application ID: ALFIFF25
Manual: NA
Publicity level: Extranet
Base: ALFIFF20
Segment: General

3.4 ALFIFF26 NXL Multi-Motor Application

Description:

This is NXL Multi-Control Application without PID and PFC control. 2 Motor parameter sets are included. Different sets are selected by digital input. Typically used by OEM customers when 2 different types of motors are used with same frequency converter.

Note: Motors cannot be used at the same time.

Data:

Application ID: ALFIFF26
Manual: UD00919
Publicity level: Internet
Base: ALFIFF25
Segment: General

3.5 ALFIFF27 NXL Local/Remote Application

Description:

Local/Remote application is designed for the cases, where the frequency converter must be controlled from two different control places. Usually local control place is panel and remote control place is I/O-terminal or fieldbus. For each control place the frequency reference can be selected from the panel, I/O (current or voltage input), fieldbus or motor potentiometer. Active control place is selected with digital input DIN6.

Local/Remote application has the same parameter groups than in Standard application.

Data:

Application ID: ALFIFF27
Manual: UD01065
Publicity level: Internet
Base: NXS Local Remote
Segment: General, PFC

3.6 ALFIFF28 NXL Lift Application

Description:

NXL Application is designed be used in elevators. It has same functionality as in NXS (open loop) lift application.

Speed reference creation methods specially designed for easy integration to lift control logics.

There are separate parameter groups for controlling the mechanical brake. Application can be used also in cranes but the ALFIFF30 application is preferred.

Data:

Application ID: ALFIFF28
Manual: UD00973
Base: ALFIFF25 (and NXS Lift application ASFIFF08)
Publicity level: Internet
Segment: Elevators

3.7 ALFIFF29 Power monitored in kW

Description:

This application is based on the on NXL Multi-Control application. Power monitor value is also in kW. Motor Nom Power P2.1.23 has to be given by customer and then V1.25 in the monitoring menu shows the actual motor shaft power in kW.

Data:

Application ID: ALFIFF29
Manual: NA (Use Multicontrol manual)
Publicity level: InHouse
Base: ALFIFF20
Segment: General, PFC

3.8 ALFIFF30 Brake control Application

Description:

The Brake Control Application is typically used in applications where mechanical brake control is needed. Mainly used in hoists and cranes.

The frequency reference can be selected from the analogue inputs, fieldbus, keypad, preset speeds, motor potentiometer or 8 binary coded speed references. Separate parameter groups for controlling the mechanical brake with different settings in forward and reverse direction. The option board **NXOPTAA** is recommended to be used.

Data:

Application ID: ALFIFF30
Manual: UD01014
Publicity level: Internet
Base: ALFIFF25
Segment: General, Hoisting

3.9 ALFIFF32 NXL PID Fire mode application

Description:

The NXL Fire mode application has the same functionality as the Multi-Control application (ALFIFF20) but the PFC functions are removed and are replaced by the fire mode features.

Fire mode application is used in ventilation systems of buildings. During a fire in the building fire mode can be activated and then all faults will be automatically reset from the drive. This will allow drive run until it is totally damaged or fire mode is deactivated. Idea is to keep hallways overpressure during the fire and smoke out of the hallways.

Fire mode is activated via a digital input (programmable).

Note: Fire mode activation will void warranty.

When fire mode is active, a fire mode warning (A81) is brought up on the display. When running in fire mode, the converter is programmed to enable the user to run the converter until either the digital input is removed or the converter is damaged

Data:

Application ID: ALFIFF32
Manual: UD01060
Publicity level: Internet
Base: ALFIFF20
Segment: General, PFC

3.10 ALFIQ106 Multicontrol (US version)

Description:

Multi-Control application where defaults values of some parameters has "US defaults" (Motor nominal values; 60 Hz, 460 V, 1720 RPM). Application based on our standard Multi-Control. Start up Wizard is included.

Data:

Application ID:	ALFIQ106
Manual:	Use UD00791 (Multicontrol)
Publicity level:	InHouse
Segment:	General

4. NXP APPLICATIONS

4.1 APFIF128 Torque Follower

Description:

Application is designed for the master-slave load sharing- function in open loop motor control. Master drive sends the actual motor torque to the slave as a torque reference via SystemBus. In the slave side, it is possible to tune the incoming torque reference e.g. with parameter or with analog input. (=Load Share)

After correction, the master torque reference and slave actual motor torque goes to the PI-controller located in a slave-drive. Master torque reference is a reference value and slave actual torque is an actual value for the PI-controller. Output of the PI-controller is added to the slave main frequency reference after the frequency ramp generator. When the output of the PIC is 100.00%, the added frequency reference is equal to nominal slip of the motor (with default settings).

Data:

Application ID:	APFIF128
Manual:	UD00982
Publicity level:	InHouse
Segment:	General, PFC

4.2 APFIF131 Line synchronization application

Description:

With this application frequency converter synchronize motor frequency to mains supply. Line voltage measurement option board OPTD7with NXP is required. When Synchronization is completed then drive will be disconnected and motor will be connected to mains supply.

Data:

Application ID:	APFIF131
Manual:	UD01023
Publicity level:	Under development
Base:	ASFIF06
Segment:	General

4.3 APFIFF08 Advanced

Description:

The Advanced Application utilizes most advanced functions in NXP motor control software while it is similar than Multi-Purpose Application. It can be used in many demanding application.

Additional functions (compared MP application):

Advanced drive control profile for fieldbus communication

Flexible fieldbus data connections.

Adaptive speed controller.

Inertia compensation

System Bus support for master follower applications with speed/torque follower.

Fast and multi drive monitoring tool (NCDrive) support.

Programmable U/f curve and flux curve.

Speed /torque-selector options, window control

Automatic identification run

Support to permanent magnet motors and multiple winding motors

Power limit functions

Different power limits for motoring and generating side

Different torque limits for motoring and generating side

Cooling monitor input from heat exchange unit

Brake monitoring input and actual current monitor for immediate brake close.

Separate speed control tuning for different speeds and loads

Inching function two different references

Possibility to connect the FB Process data to any parameter and some monitoring values

Identification parameter can be adjusted manually

Data:

Application ID: APFIFF08

Manual: ud990

Publicity level: Internet

Base: Multipurpose APFIFF06

Segment: General, P&P, Metals

4.4 APFIFF09 Marine

Description:

Specially designed for Marine segment, but can be used in any demanding application.

Additional functions (compared MP application):

Most NXP performance features are available

Advanced power limit functions can be utilized

Power limits by DI or from fieldbus for both Motoring and Generating side.

Master Follower function for steering propeller and double winding motors

Different Torque limits for motoring and generating side

Cooling monitor input from heat exchange unit

Brake monitoring input and actual current monitor for immediate brake close.

Separate speed control tuning for different speeds and loads

Inching function two different reference

Possibility to connect FB Process data's to any parameter and some monitoring values

Identification parameter can be adjust manually

Analogue input 3 and 4 can control any parameter by ID number.

Support for four analogue output

Data:

Application ID: APFIFF09

Manual: UD01059

Publicity level: Internet

Segment: Marine, General, P&P, Metals

4.5 APFIFF10 System Interface Application

Description:

The System Interface Application is typically used in coordinated drives with overriding control system. The recommended interface to control the system is a fieldbus communication though hardwired analogue and digital signals as well as keypad and PC control can be used.

The System Interface Application utilises most advanced functions in NXP motor control software and is suitable for demanding drive systems like paper machines and drives in metal industry and processing lines. It can also be used for any other standard applications. Following applications are working with this application.

Pulp and paper machine drives like dryer, press section, wire section, pope reel, winder and unwinder. Drives in metal industry like casting machine, melt shop or preparing line. Standard drives like pump and fan, lifts, cranes, conveyors, etc.

Additional functions:

Flexible speed and torque reference chains.

Advanced drive control profile for fieldbus communication

Flexible fieldbus data connections.

Adaptive speed controller.

Inertia compensation and oscillation damping features.

System Bus support for master follower applications with speed/torque follower.

Fast and multi drive monitoring tool (NCDrive) support.

Programmable U/f curve and flux curve.

Speed /torque-selector options, window control

Automatic identification run

Support to permanent magnet motors and multiple winding motors.

Data:

Application ID:	APFIFF10
Manual:	UD01005
Publicity level:	Internet
Segment:	General, P&P, Metals

4.6 APFIFF11 Shaft Synchronization application

Description:

Shaft synchronization application is actually position follower. Follower position is controlled by master command pulses connected to encoder board channel 2. Application works only in closed loop control.

The Shaft Synchronization application creates a rigid electrical coupling between master and follower(s) axis. The application is not suitable if there is a rigid mechanical coupling between master and follower(s).

Specific application features:

Synchronization commands: engage/release synchronization, freeze actual speed and independent reference speed are all controlled from digital inputs or fieldbus control register
Ratio range -4 to +4 in steps of 1/65536 can be controlled by parameter or fieldbus in RUN mode

Programmable trim inputs +/- and trim ratio change parameter for temporary ratio change from digital inputs

Programmable ratio change ramp

Programmable engage/ release ramp

Digital or relay outputs for "Ratio change" and "Synchronization engaged"

Supported fieldbuses: Profibus, CanOpen, Modbus, Modbus TCP

Synchronization regulator cycle time is 5 ms

Phasing from standstill or during running (offset of follower position)

Requirements

NXP frequency converter with control board type VB00561 ("npx2" type) or newer.

NXP00002V155 system software package (NXP00002V160 for the support of single phase master pulse reference).

Double encoder board OPTA7 for induction motor with HTL incremental encoder for closed loop control. The second encoder channel is used for master pulse reference.

Resolver board OPTBC for permanent synchronous motor with resolver feedback for closed loop control. The second encoder channel is used for master pulse reference.

Application license key is required for shaft synchronization function. During the 2 weeks trial time it is possible to run without license key.

Data:

Application ID:	APFIFF11
Manual:	UD01036
Publicity level:	Internet
License:	Required
Segment:	Motion control

4.7 APFIFF12 Position Control application

Description:

This is single axis Position Control application with interpolated position controller. Positioning is performed directly to target position without "creep speed" before stopping. S-curves are currently not possible. Incremental encoder for motor control needs to be in motor shaft. Addition encoder for position control can be mounted after the gear box. Accuracy is +/- 1 user unit. Positions are given in user units (u) (e.g in mm).

The position control application is has following functions:

Single axis trapezoidal interpolator (follows a predefined motion profile calculated in application)

Linear ramp

Programmable distance/turns in engineering unit makes it possible to work only with engineering units

Using of motor encoder or auxiliary encoder for the positioning loop

7 possible calibration modes (manual, Calibration sensor, Z-Pulse, with or without backlash compensation)

Positioning commands, jog, incremental jog, calibration, homing

Static and dynamic distance error supervision

Software limit stop (positioning range)

Hardware limit stop (min, max) by digital input control with alarm

Position control enable by parameter, digital input or by fieldbus (switching from speed control to position control and vice versa)

Jog and teach of positions from the keypad Jog Teach menu.

Preset positioning speed or adjustable speed by analogue input

Programmable automatic cycle up to 6 targets, with programmable dwell time and trigger

Support of either induction motor or permanent magnet synchronous motor (AC brushless)

Data:

Application ID:	APFIFF12
Manual:	UD01036
Publicity level:	Internet
License:	Required
Segment:	Motion control

4.8 APFIFF15 3-Speed Positioning for NXP

Description:

This application is based on 3 different approaching speeds. Typically final creep speed is only about 1Hz. Application requires manual tuning of different speeds. Usually when load is constant accuracy is few encoder pulses, which is enough in many cases. Application APFIFF12 should be used when real position control is required.

Features:

Positioning application is utilising incremental encoder

Sheet cut mode is included

Power off/on calibration.

Fieldbus support. (Profibus, Modbus, DeviceNet)

Application supports two drive synchronous positioning with absolute encoder support (no need to make calibration run after power down)

Data:

Application ID: APFIFF15

Manual: UD01022

Publicity level: Extranet

Segment: General, Motion control

4.9 APFIFF19 Fast response (old)

This is old application and all features (Like fast internal cycle time) are included in APFIFF06 or APFIFF08. Please use new applications.

4.10 APFIFF21 Master Follower (old)

This is old application and all features (Like Master Follower) are included in APFIFF06 or APFIFF08 or APFIFF09. Please use new applications.

4.11 APFIFF26 Winder Application for NXP

Description:

This is a Center winder application with internal radius calculation. The Winder Application can be used for the control of winder or unwinder solutions. This application can control tension of the material to an approximately constant value through the radius range. This application can be used when there is no high demand on accuracy.

In case high demand of accuracy use overriding PLC and system interface application APFIFF10.

Data:

Application ID: APFIFF26
Manual: UD00865
Publicity level: Extranet
Segment: General,

4.12 APFIFF31 Enlarged MultiMaster PFC

Description:

The MultiMaster & MultiFollower PFC applications are in this one for bigger pump systems (4-6 pumps). It requires NPX drives and CAN card. Special functions included are broken pipe supervision and Pre-fill. Other features like in MultiFollower and MultiMaster Applications.

Data:

Application ID: APFIFF31
Manual: UD01046
Publicity level: Under Development
License: Required
Segment: General, PFC, Water

4.13 APFIFF32 Energy saving application

Description:

This application compares saved energy when process is controlled by valves and then valves are replaced with frequency converter. Based on the PFC applications.

Data:

Application ID: APFIFF32
Manual: NA (in Finnish only)
Publicity level: InHouse
Base: PFC ASFIFF07
Segment: General, PFC

4.14 APFIFF33 NXP Lift application

Description:

Same function as in APFIFF08 Standard lift application but with PM motor support added.

Data:

Application ID: APFIFF33
Manual: UD01041
Publicity level: Extranet
Base application: ASFIFF08V203
Segment: Elevator

4.15 APFIG102 NXP Application package

Description:

NXP High performance application package. Currently applications are split to individual applications.

Package Includes:

System interface application APFIFF10
Shaft Synchronization application APFIFF11
Position Control application APFIFF12

Data:

Application ID: APFIG102
Manual: UD01036
Publicity level: Extranet
Segment: General, Motion control

4.16 APFIEN03 System Interface application (old)

This is "old" application and all features are included in APFIFF10.
Please use new version form applications.

Data:

Application ID: APFIEN03
Manual: UD01006
Publicity level: InHouse
Segment: General, P&P, Metals

5. NXS APPLICATIONS (ALSO FOR NXP)

5.1 ASFIF100 Load Simulation Application

Description:

This application can be used for simulating a load motor with different kinds of loads in laboratory test benches.

Data:

Application ID: ASFIF100
Manual: UD00748 (in finish only)
Publicity level: InHouse
Segment: General

5.2 ASFIF101 Multimaster PFC Demo Application

Description:

Only for use with Vacon water demonstration bench.

Data:

Application ID: ASFIF101
Manual: UD00816
Publicity level: InHouse
Segment: Demo units

5.3 ASFIF105 Standard application with lower low temperature limit

Description:

This is standard application where low temperature limit has been changed from -10°C to -30°C. Drive hardware must be designed accordingly.

Data:

Application ID: ASFIF105
Manual: NA (Standard ASFIF02 can be used)
Publicity level: Customer specific
Base application: Standard
Segment: General

5.4 ASFIF111 Standard with stabilization parameters

Description:

Voltage, torque and flux stabilization parameters are added to as parameters. These parameters can be used to avoid output frequency oscillation.

Data:

Application ID: ASFIF111
Manual: UD00807
Publicity level: Customer specific
Base application: Standard
Segment: General

5.5 ASFIF121 PID with two parameter sets

Description:

Possibility to select two parameter sets by using digital input.

Data:

Application ID: ASFIF121
Manual: UD00802
Publicity level: InHouse
Segment: General, PFC

5.6 ASFIF125 Flow control application for heat exchange unit

Description 1: (New version ASFIF125 version 4.00 and above)

Standard application designed to control water cooling systems in Liquid cooled Drives.

Possibility to use two pumps with one FC in the system.

The version series 4.00 and above uses **a flow sensor instead of two pressure sensors** to calculate the flow, it has also a temperature sensor built-in. The flow sensor gives out a signal called "Cooling OK" that allows the Main (liquid cooled) drive to run.

Description 2: (Older software version ASFIF125 version 3.xx)

Standard application designed to control water cooling systems in Liquid cooled Drives.

Possibility to use two pumps with one FC in the system. This version uses **two pressure sensors** to calculate the flow. There is also a separate sensor for temperature measurements.

Data:

Application ID: ASFIF125
Manual: UD00840
Publicity level: Extranet
Segment: General

5.7 ASFIF131 Variable Voltage Application

Description:

This application is not designed for motor control. Output frequency and voltage can be set as needed by tuning the U/f-curve. U/f-curve can be tuned by adjusting U/f midpoint and FWP point. Analog inputs or parameter are used for tuning of these points.

Data:

Application ID: ASFIF131
Manual: UD00886
Publicity level: Extranet
Segment: Not for motor control (Artificial mains supply)

5.8 ASFIF136 PID with standard start stop logic

Description:

Possibility to use standard application start/stop signal logic in PID application.

Data:

Application ID: ASFIF136
Manual: NA
Publicity level: InHouse
Segment: General, PFC

5.9 ASFIF141 MP Multi Motor 2

Description:

Multi Motor 2 application is based on the multipurpose application. This application is suitable for different kind of test benches and as a part of machines when two motors are not used at the same time. Possibility to change motor parameters between two different sets. Motor parameters sets are changed within 20 ms.

Data:

Application ID: ASFIF141
Manual: UD00928
Publicity level: Extranet
Base: ASFIF06
Segment: General

5.10 ASFIF142 Frequency/current generator application

Description:

Note! This application is not designed for running motors! The frequency converter controls the output voltage so that a current reference is achieved. The frequency converter can start direct with reference frequency.

Data:

Application ID: ASFIF142
Manual: UD00927
Publicity level: InHouse
Segment: Not for motor control (induction heater)

5.11 ASFIF143 Service time counter

Description:

This PID application supervises the operation hour trip counter. When the drive has run a parameter set amount of hours it will put a message, "SERVICE", to the panel. This is to inform the operator that it is time for doing some service activities to the device.

Data:

Application ID: ASFIF143
Manual: UD00937
Publicity level: InHouse
Segment: General, PFC

5.12 ASFIF146 Sinus and du/dt filter application

Description:

This application can be used with sinus or du/dt filters if needed. There are parameters to select correct filter and over modulation limit if needed.

Data:

Application ID: ASFIF146
Manual: NA
Publicity level: Customer Specific
Segment: General

5.13 ASFIF149 MP Multi Motor 3

Description:

This is Multi motor 3 application which based on the multi motor 2 application. This application is suitable for different kind of test benches and as a part of machines when two or more motors are not used at the same time.

Data:

Application ID: ASFIF149
Manual: NA
Publicity level: InHouse
Base application: ASFIF141V106
Segment: General

5.14 ASFIF150 Multi Step Speed control application with torque stabiliser

Description:

This is Multi-Step speed application with torque stabiliser parameters. These parameters can be used to avoid output frequency oscillation.

Data:

Application ID: ASFIF150
Manual: NA
Publicity level: InHouse
Base application: ASFIFF04
Segment:

5.15 ASFIF151 PFC with 2 parameter set

Description:

Possibility to use 2 parameter set in PFC application as in multipurpose APFIFF06 application.

Data:

Application ID: ASFIF151
Manual: NA (MP manual can be used)
Publicity level: InHouse
Base application: ASFIFF07V309
Segment: PFC

5.16 ASFIF154 Special MP (Reverse not possible)

Description:

Reverse direction is completely prohibited.

Data:

Application ID: ASFIF154
Manual: NA (MP manual can be used)
Publicity level: InHouse
Segment: General

5.17 ASFIF155 Local / Remote with 4 analogue outputs

Description:

This is Local / Remote application with 4 analogue outputs.

Data:

Application ID: ASFIF155
Manual: NA (L/R application manual can be used)
Publicity level: InHouse
Base application: ASFIFF03V311
Segment: General

5.18 ASFIF156 Sequence Application (40 Steps)

Description:

This is Sequence application with 40 steps. Steps above 10 does not have own acceleration time parameters.

Data:

Application ID: ASFIF156
Manual: NA
Publicity level: InHouse
Base application: ASFIFF26
Segment: General, Textile

5.19 ASFIFF08 Standard Lift Application

Description:

The Lift Application can be used with modern Lift systems. There are functions included that are required to achieve a smooth ride in the lift car. The I/O interface table includes the most commonly needed signals in lift applications.

In the application, constant speeds are presented in [m/s] and also in [Hz], acceleration and deceleration are presented in [m/s²] and jerks are presented in [ms]. Mechanical brake control logic is designed to achieve smooth departures from and landings to floor level. The brake can be set in various ways to meet the different requirements of lift motors and lift control logic.

The used hardware can be any Vacon NXS or NXP frequency converter. In closed loop motor control mode NXP drive and encoder option board is required (NXOPTA4 or NXOPTA5).

All outputs are freely programmable. Digital input functions are freely programmable to any digital input. Start forward and reverse signals are fixed to input DIN1 and DIN2 (see next page).

If Permanent magnet synchronous motor is needed to run then select application APFIFF33 NXP Lift application.

Data:

Application ID: ASFIFF08
Manual: UD00758
Publicity level: Internet
Base application: Standard ASFIFF02
Segment: Elevators

5.20 ASFIF09 Multi-Master PFC

Description:

The application is designed to achieve an even wear of the pumps connected to the motors/drives by regularly changing the regulating order of the drives. The application supports max. 3 devices to work in parallel. One drive is leading and regulating (PID) while the others are either stand-by or running at the speed producing the nominal flow in the system.

The autochange of the regulating drive/pump can be performed during run without any notice in the pressure in the pipes. This means also that each drive can become the regulating drive of the system.

Due to the fact that all 3 devices are controlled by its own drive, will the system be controlled even if one or two of the drives are tripped.

Data:

Application ID: ASFIFF09
Manual: UD00861
Publicity level: Intranet (as part of the ASFIG100)
Segment: General, PFC, Water

5.21 ASFIFF10 Easy synchronization application

Description:

Application is suitable f.e. synchronizing conveyor belts, conveyors, and isolate parts upon transition from one conveyor to next and similar needs.

One frequency converter is the master and the other is the slave. All frequency converters follow the same speed.

Data:

Application ID: ASFIFF10
Manual: UD00756
Publicity level: Extranet
Segment: General

5.22 ASFIFF11 Fire mode PID application

Description:

Fire mode application is used in ventilation systems of buildings. During a fire in the building fire mode can be activated and then all faults will be automatically reset from the drive. This will allow drive run until it is totally damaged or fire mode is deactivated. Idea is to keep hallways overpressure during the fire and keep the smoke out of the hallways.

The Fire Mode PID application is functionally the same as the PID application of the "All IN ONE" package. The Fire Mode function is activated with DIN.

When running in fire mode, the converter is programmed to enable the user to run the converter until either the digital input is removed or the converter is damaged

Note: Fire mode activation will void warranty.

Data:

Application ID: ASFIFF11
Manual: UD00752
Publicity level: Internet
Segment: General, PFC

5.23 ASFIFF12 High speed application

Description:

High speed application for NXS- and NXP-drives up to 1900 Hz. License needed for freq. 1901Hz-7200Hz. The acceleration and deceleration ramp times can be set to 30000s (8h 20min) with 1s resolution.

The application has also a "Trial Time" included. This means that the customer may try the application for 336h for free. After that will the drive TRIP, if the correct License key hasn't been entered.

Data:

Application ID: ASFIFF12
Manual: UD00735
Publicity level: Internet
License: Required
Base application: ASFIFF02
Segment: General

5.24 ASFIFF13 Beam Pump Application

Description:

Beam Pump application keeps strokes/minute constant while oil level changes. It has been designed for unbalanced and balanced pumps.

Data:

Application ID: ASFIFF13
Manual: UD00749
Publicity level: Extranet
Segment: General, PFC

5.25 ASFIFF15 3-Speed Positioning

Description:

This application is based on 3 different approaching speeds. Typically final creep speed is only about 1Hz. Application requires manual tuning of different speeds. Usually when load is constant accuracy is few encoder pulses, which is enough in many cases. Application APFIFF12 should be used when real position control is required.

Data:

Application ID: ASFIFF15
Manual: UD00812
Publicity level: Extranet
Segment: General, (Motion control)

5.26 ASFIFF16 Multimotor 7add application (with high speed 1900Hz)

Description:

There is possibility to connect 1+7 different motors to one frequency converter. The motor in use is selected either by DIN4-DIN6 or via fieldbus. It is possible to run the application up to 1900Hz.

Data:

Application ID: ASFIFF16
Manual: UD00753
Publicity level: Extranet
Segment: General

5.27 ASFIFF17 Mechanical brake control application

Description:

Mechanical brake control application for vertical and horizontal movement.

The Mechanical brake control application has specific parameters for mechanical brake control logic and supervision of the mechanical brake. The application works with in open loop or in closed loop.

NOTE: Strongly recommended to use closed loop for vertical movement with heavy loads to get smooth start and landings.

Data:

Application ID: ASFIFF17
Manual: UD00803
Publicity level: Extranet
Segment: General, Hoists

5.28 ASFIFF18 Winder Application

Description:

This is a Center winder application with internal radius calculation. The Winder Application can be used for the control of winder or unwinder solutions. This application can control tension of the material to an approximately constant value through the radius range. This application can be used when there is no high demand on accuracy.

In case high demand of accuracy use overriding PLC and system interface application.

Data:

Application ID: ASFIFF18
Manual: UD00806
Publicity level: Extranet
Segment: General

5.29 ASFIFF23 High Speed (1900Hz) PID Application

Description:

PID application with High Speed features. It has the possibility to run up to 1900Hz. Also possible to use encoder information as actual value for the PID-regulator

Data:

Application ID: ASFIFF23
Manual: UD00830
Publicity level: Extranet
Segment: General

5.30 ASFIFF24 Advanced Level Control application

Description:

With the *Advanced Level Control application* you can build a system where up to 3 drives control the pumping from a storage tank.

One frequency converter controls the pump that is the leading pump and handles the main regulation and the other ones are started if the liquid level in the tank is close to reaching the edge of the tank.

This system guarantees that the flow from the tank remains as steady as possible. In case of excessive amount of water in the tank for the leading pump to handle and the buffering capacity of the tank is not enough the auxiliary pumps will start before the tank flows over.

The application is designed to achieve an even wear of the pumps connected to the motors/drives by regularly changing the regulating order of the drives. The application supports max. 3 devices to work in parallel.

The autochange of the regulating drive/pump can be performed during run without any notice in the flow in the pipes. This means also that each drive can become the regulating drive of the system.

Due to the fact that all 3 devices are controlled by its own drive, will the system be controlled even if one or two of the drives are tripped.

Data:

Application ID:	ASFIFF24
Manual:	UD00861
Publicity level:	Intranet (as part of the ASFIG100)
Segment:	General, PFC, Water

5.31 ASFIFF26 Sequence

Description:

This is application with programmable sequence with different speeds and ramps. Maximum 8 steps can be defined sequence. Step configuration with speed, acceleration/deceleration time from previous step and Step hold time and Stop deceleration time.

Single or cyclic sequence: 1...65000 repeats, continuous run.

Sequence function activated with parameter or digital input, high speed (1900 Hz).

Claimed to be useful in water segment also, e.g. when cleaning the sand in the cleaning tank.

Data:

Application ID: ASFIFF26
Manual: UD00874
Publicity level: Extranet
Segment: General, Textile, Water

5.32 ASFIFF28 Hydrofor Application

Description:

This is a PFC application where the pressure in a tank is pumped up to a set level and then falls asleep. The pressure in the pipeline is depending of the pressure in the tank. The drive will wake up to increase the pressure again when it has fallen below a certain level in the tank.

Data:

Application ID: ASFIFF28
Manual: UD00895
Publicity level: InHouse
Segment: Water, PFC

5.33 ASFIFF29 PID with movable Wakeup level

Description:

This is a PID application where the wake-up level is related to the set point. I.e. if the set point is changed will the wake –up level change automatically.

Data:

Application ID: ASFIFF29
Manual: UD00910
Publicity level: Extranet
Segment: PFC, Water

5.34 ASFIFF30 MultiFollower PFC

Description:

The application is designed to achieve an even wear of the pumps connected to the motors/ drives by regularly changing the regulating order to of the drives. The application supports the maximum of 3 pumps, fans or compressors to work in parallel.

One drive is leading and regulating (PID) while the others are either stand-by or, if working as auxiliary drives, following the same speed that the leading one is running at.

The autochange of the regulating drive/pump can be performed during run without any notice in the pressure in the pipes. This means also that each drive can become the regulating drive of the system.

Due to the fact that all 3 devices are controlled by its own drive, will the system be controlled even if one or two of the drives are tripped.

This application is a development of the MultiMaster PFC application. In this application will the auxiliary drives run at the same speed as the master, i.e. the regulating drive.

Data:

Application ID: ASFIFF30
Manual: UD00861
Publicity level: Intranet (as part of the ASFIG100)
Segment: PFC, Water

5.35 ASFIFF32 PFC with special reference display

Description:

This is PFC application with special reference display. The reference for the PID is given in the same unit as the "actual value special display".

Data:

Application ID: ASFIFF32
Manual: NA
Publicity level: InHouse
Base application: PFC v3.09
Segment: PFC, Water

5.36 ASFIG100 Water Solutions application package

Description:

The package includes the following applications:
(See detailed description from individual applications)
Basic (ASFIFF01)
MultiMasterPFC (ASFIFF09)
Advanced Level Control (ASFIFF24)
MultiFollowerPFC(ASFIFF30)

Data:

Application ID: ASFIG100
Manual: UD00861
Publicity level: Internet
Segment: Water, PFC

5.37 ASFIQ018 PID with programmable DIN6

Description:

PID with programmable DIN6

Data:

Application ID: ASFIQ018
Manual: NA
Publicity level: InHouse
Base application: ASFIFF05
Segment: General, PFC

5.38 ASBEG001 Sine filter application package for NXS/P

Description:

Sine filter application package (same as "all-in-one"). There is a parameter in this application which can be selected to enable/disable switching frequency reduction even if drive temperature rises. Parameter has been added to group 2.6. SINE FILTER (Expect Basic application).

Application Group which includes following applications:

ASBEFF08V101
ASBEFF09V101
ASBEFF10V101
ASBEFF11V101
ASBEFF12V101
ASBEFF13V101
ASBEFF14V101

Data:

Application ID:	ASBEG001
Manual:	UD00929
Publicity level:	InHouse
Segment:	General

6. COMMON DC-BUS

6.1 ABFIFF01 Brake Chopper unit application

Description:

The BCU (Brake chopper unit) is a unidirectional power converter for the supply of excessive energy from a common DC bus drive line-up to resistors where the energy is dissipated as heat. External resistors are needed.

Data:

Application ID: ABFIEN01
Manual: UD01113
Publicity level: InHouse
Segment: General, P&P, Metals, Marine

6.2 AFFIFF01 Fundamental Front End (FFE) Application

Description:

This is Regenerative Fundamental front end application.

The FFE unit is to be connected between Network and DC bus bar for transferring power in both directions.

When supplying energy to the network (Generating) the current flows thru the controlled IGBT-bridge. The system software controls the current flow against the network.

When consuming energy from the network (Motoring) the current flows thru the free wheeling diodes. The FFE cannot control the current flow in this direction but there is overload protection available in the application.

The Expander board OPTD7 card has to be installed in slot C for measuring the line voltage phase and amplitude.

Data:

Application ID: AFFIFF01
Manual: UD01049
Publicity level: InHouse
Segment: General, P&P, Metals, Marine

6.3 ARFIFF02 Regenerative supply unit (AFE) Application

Description:

Application for Active Front End (AFE) unit with NXP control. AFE unit is a bidirectional (regenerative) power converter for the front-end of a common DC bus drive line-up. An external LCL filter is used at the input. The AFE unit controls and maintains the DC link voltage and when needed supply energy back to network. The DC link voltage reference can be set by parameter.

Additional AFE units can be installed in the same DC bus bar by using system bus.

The expander board OPTB5 card has to be installed in slot D when extra outputs are needed.

Data:

Application ID:	ARFIFF01
Manual:	UD00920
Publicity level:	InHouse
Segment:	General, P&P, Metals, Marine

7. ALL-IN-ONE APPLICATIONS

7.1 All-In-One features

Feature	BASIC, ASFIFF01	STANDARD, ASFIFF02	LOCAL/REMOTE, ASFIFF03	MSS, ASFIFF04	PID, ASFIFF05	MP, ASFIFF06	MP (NXP), APFIFF06	PFC, ASFIFF07
Motor control								
Motor nameplate data	x	x	x	x	x	x	x	x
Open loop freq. control	x	x	x	x	x	x	x	x
Open loop speed ctrl		x	x	x	x	x	x	x
Open loop torque ctrl						x	x	
Closed loop speed ctrl		x	x	x	x	x	x	x
Closed loop torque ctrl						x	x	
PMSM							x	
Load drooping		x	x	x	x	x	x	x
Control								
Control places (PC, I/O, Panel, FB)	x	x	x	x	x	x	x	x
Basic fieldbus support (Start/Stop, Status)	x	x	x	x	x	x	x	x
Fieldbus PD in Selection							x	
Fieldbus PD out selection						x	x	
Preset speeds	2	2	1	16	1	8	8	1
Joystick control						x	x	
Prohibit frequencies		1	3	3	3	3	3	3
PID-control					x			x
Pump and Fan control logic for 1+4 aux. drives								x
Master Follower							x	
IO-handling								
Digital inputs (Fixed/programmable)	Slot A (1/5)	Slot A (1/5)	Slot A (1/5)	Slot A (1/5)	Slot A (3/3)	All Slots	All Slots	All Slots
Digital outputs (Digital/Relay outputs)	Slot A/B (1/2)	Slot A/B (1/2)	Slot A/B (1/2)	Slot A/B (1/2)	Slot A/B (1/2)	All Slots	All Slots	All Slots
Digital output On/Off delay functions						2	2	
Analog inputs	2	2	2	2	4	4	4	4
Analog outputs (amount of outputs)	Slot A 1	Any slots (2)	Any slots (2)	Any slots (2)	Any slots (2)	Any slots (3)	Any slots (3)	Any slots (3)

7.2 Basic

Description:

The simplest application of the "All-In-One" applications. Frequency reference can be selected from keypad, I/O (current or voltage input) or fieldbus. Start/Stop and reverse logic from I/O is fixed to digital inputs DIN1 and DIN2 on slot A.

Application Features:

Automatic torque boost.

Current reference offset 0/4mA.

FTT-programmable analog output AO1.

FTT-programmable digital input DIN3.

Two preset speeds.

Automatic fault reset and restart function for the following faults:

#1	Overcurrent fault
#2	Overvoltage fault
#9	Undervoltage fault
#16	Motor overtemperature fault
#17	Motor Underload fault
#31	IGBT temperature (hardware)
#41	IGBT temperature (software)
#50	4mA fault
#51	External fault

Option Board Requirements:

NXOPTA1

NXOPTA2

Typical Use:

HVAC

7.3 Standard

Description:

The standard application is typically used in pump, fan and conveyor applications, for which the Basic application is too limited, but where no special features are needed. Standard application has more flexible I/O programming and expanded parameter groups for drive/motor control and protections. Frequency reference can be selected from keypad, I/O (current or voltage input) or fieldbus. Start/Stop logic is programmable.

Application Features:

Programmable frequency reference sources for each control places.

Two preset speeds

Programmable start/stop-logic

FTT-programmable digital input DIN3. ¹⁾

Current reference offset 0/4mA.

Reference scaling, inversion and filtering.

Two TTF-programmable analog inputs. ²⁾

Two TTF/FTT-programmable ³⁾ analog outputs with offset, filtering, inversion and scaling.

FTT-programmable digital and relay outputs.

One output frequency limit supervision function.

Two frequency ramp profiles and S-shape programming.

DC-brake and flux brake functions.

One prohibit frequency window.

Open- and closed loop motor control modes.

Programmable U/f-curve and automatic torque boost.

Parameters for overvoltage and undervoltage controllers.

Load drooping

Identification

Speed and current controller parameters in Closed Loop-mode.

Expanded protections; programmable fault response modes for the following faults:

#3	Earth fault
#10,#11	Input/output phase supervision
#15	Stall protection
#16	Motor thermal protection
#17	Underload protection
#29	Thermistor fault
#50	4mA fault
#51	External fault
#53	Fieldbus fault
#54	Slot fault

Programmable auto restart function for the following faults:

#1	Overcurrent fault
#2	Overvoltage fault
#9	Undervoltage fault
#16	Motor overtemperature fault
#17	Motor Underload fault
#50	4mA fault

#51 External fault

Option Board Requirements:

NXOPTA1, NXOPTA2

TTF-programmable I/O supports any slot and any option board.

Typical Use:

Industrial, HVAC, Conveyors

7.4 Local/Remote Control

Description:

Local/Remote application is designed for the cases, where the frequency converter must be controlled from two different places. Usually local control place is panel and remote control place is I/O-terminal or fieldbus. For each control place the frequency reference can be selected from either the panel, I/O (current or voltage input), fieldbus or motor potentiometer. Active control place is selected with digital input DIN6.

Local/Remote application has the same parameter groups than Standard application.

Application Features:

Programmable frequency reference sources for each control places.

One jogging speed.

Individually programmable start/stop-logic for local and remote control places.

FTT programmable digital input DIN3.

Two TTF-programmable analog inputs with signal range, inversion, filtering and scaling functions.

Individual reference scaling for local and remote references.

Free analog input function. Can be programmed to control current limit, DC-brake current, acceleration/deceleration times or torque limit.

Motor potentiometer. Frequency reference can be saved over the power break.

Run status memory. Run status can be copied when changing the control place from local to remote or vice versa.

Two TTF/FTT-programmable analog outputs with offset, filtering, inversion and scaling.

FTT-programmable digital and relay outputs.

Two output frequency limit supervision function.

Torque limit supervision function.

Reference limit supervision function.

Frequency converter temperature limit supervision function.

On/Off-delayed output for external brake control.

Two frequency ramp profiles and S-shape programming.

DC-brake and flux brake functions.

Three prohibit frequency windows.

Open- and closed loop motor control modes.

Programmable U/f-curve and automatic torque boost.

Parameters for overvoltage and undervoltage controllers.

Load drooping

Identification

Speed and current controller parameters in Closed Loop-mode.

Expanded protections; programmable fault response modes for the following faults:

#3 Earth fault

#10,#11 Input/output phase supervision

#15 Stall protection

#16 Motor thermal protection

#17 Underload protection

#29	Thermistor fault
#50	4mA fault
#51	External fault
#53	Fieldbus fault
#54	Slot fault

Programmable auto restart function for the following faults:

#1	Overcurrent fault
#2	Overvoltage fault
#9	Undervoltage fault
#16	Motor overtemperature fault
#17	Motor Underload fault
#50	4mA fault
#51	External fault

Option Board Requirements:

NXOPTA1, NXOPTA2

TTF-programmable I/O supports any slot and any option board.

Typical Use:

Industrial, HVAC, Conveyors

7.5 Multi-Step Speed Control

Description:

Multi-Step Speed Control application is designed for the processes, where the motor speed must be controlled with the fixed speed steps. These kind of processes are coordinated conveyors, simple machine tools and positioning purposes.

Speed steps are pre-defined with the parameters and they are activated using digital inputs DIN4, DIN5 and DIN6. (DIN4 is the LSB)

15 different speed steps can be programmed. In addition, it is possible to use one jogging speed. Jogging speed can be activated with digital input DIN3 (if programmed) and it will override all other speed steps.

Basic frequency reference can be programmed from either the panel, I/O (current or voltage input) or fieldbus.

Application Features:

Programmable frequency reference sources for each control places.

One jogging speed.

15 programmable preset speeds.

Programmable start/stop-logic.

FTT programmable digital input DIN3.

Two TTF-programmable analog inputs with signal range, inversion, filtering and scaling functions.

Reference scaling function.

Free analog input function. Can be programmed to control current limit, DC-brake current, acceleration/deceleration times or torque limit.

Two TTF/FTT-programmable analog outputs with offset, filtering, inversion and scaling.

FTT-programmable digital and relay outputs.

Two output frequency limit supervision function.

Torque limit supervision function.

Reference limit supervision function.

Frequency converter temperature limit supervision function.

On/Off-delayed output for external brake control.

Two frequency ramp profiles and S-shape programming.

DC-brake and flux brake functions.

Three prohibit frequency windows.

Open- and closed loop motor control modes.

Programmable U/f-curve and automatic torque boost.

Parameters for overvoltage and undervoltage controllers.

Load drooping

Identification

Speed and current controller parameters in Closed Loop-mode.

Expanded protections; programmable fault response modes for the following faults:

#3	Earth fault
#10,#11	Input/output phase supervision
#15	Stall protection
#16	Motor thermal protection

#17	Underload protection
#29	Thermistor fault
#50	4mA fault
#51	External fault
#53	Fieldbus fault
#54	Slot fault

Programmable auto restart function for the following faults:

#1	Overcurrent fault
#2	Overvoltage fault
#9	Undervoltage fault
#16	Motor overtemperature fault
#17	Motor Underload fault
#50	4mA fault
#51	External fault

Option Board Requirements:

NXOPTA1, NXOPTA2

TTF-programmable I/O supports any slot and any option board.

Typical Use:

Industrial, HVAC, Conveyors

7.6 PID Control

Description:

The PID-application is typically used to control level measuring or pumps and fans. In these processes, the PID application provides a smooth control and an integrated measuring and controlling package where external PID-loop is not needed.

With the help of the internal PID-controller the actual value of the process (e.g. pressure or temperature) can be controlled according to the reference value. The process actual value is measured by an actuator. If the actual value is not equal to reference value, the motor speed is changed as long as the actual value reaches the reference value.

In the PID-application, there are two I/O terminal control places; place A is the PID-controller and place B is direct frequency reference. The control place A or B is selected with digital input DIN6.

The PID-controller reference can be selected from the analogue inputs (current or voltage), fieldbus, motor potentiometer or keypad. Keypad has two different PID-references. The selection between these two keypad references is made by digital input 5, if parameter "DIN5 Function" is programmed to value #13 "PID Ref2 Sel".

The PID-controller actual value can be selected from the analogue inputs (current or voltage), fieldbus, the actual values of the motor (e.g. motor speed or torque).

Actual value can also be a result of the mathematical function calculated using actual value 1 and actual value 2.

(For example; Actual Value=analogue input 1+analogue input 2)

If sleep function is used, the motor is stopped when the actual value remains in the pre-defined window. (For example: Drive is controlling the water pipe pressure. Drive goes to sleep mode at night, when additional pressure is not needed. At the morning, when the pressure drops and the actual value goes outside the sleep limits, the drive will automatically start to increase the speed to produce more pressure.)

The direct frequency reference can be used for the control without the PID-controller. Direct frequency reference can be selected from the analogue inputs, fieldbus, motor potentiometer or keypad.

Application Features:

Programmable PID-reference source.

Parameters for the P-, I, and D-terms for the PID-controller.

Sleep function with output frequency limit and delay time supervision. Programmable wake-up limit and wake-up function.

One jogging speed.

FTT programmable digital inputs DIN2, DIN3 and DIN5.

PID sum point reference. (E.g. PID-output + analogue input 1)

Programmable direct frequency reference sources for each control places. (Control place B.)

Two actual value inputs with scaling.

Four TTF-programmable analog inputs with signal range, inversion, filtering and scaling functions.

Motor potentiometer.

Two PID-controller acting modes;

[Reference-Actual]=Reverse Acting

[Actual-Reference]=Forward Acting

Easy changeover function.

Special units for the actual value display. (28 different units.)

Two TTF/FTT-programmable analog outputs with offset, filtering, inversion and scaling.

FTT-programmable digital and relay outputs.

Two output frequency limit supervision function.

Torque limit supervision function.
 Reference limit supervision function.
 Frequency converter temperature limit supervision function.
 On/Off-delayed output for external brake control.
 Two frequency ramp profiles and S-shape programming.
 DC-brake and flux brake functions.
 Three prohibit frequency windows.
 Open- and closed loop motor control modes.
 Programmable U/f-curve and automatic torque boost.
 Parameters for overvoltage and undervoltage controllers.
 Load drooping
 Identification
 Speed and current controller parameters in Closed Loop-mode.
 PT100 support. (Max. 3 sensors can be connected.)

Expanded protections; programmable fault response modes for the following faults:

#3	Earth fault
#10,#11	Input/output phase supervision
#15	Stall protection
#16	Motor thermal protection
#17	Underload protection
#29	Thermistor fault
#50	4mA fault
#51	External fault
#53	Fieldbus fault
#54	Slot fault
#56	PT100 fault

Programmable auto restart function for the following faults:

#1	Overcurrent fault
#2	Overvoltage fault
#9	Undervoltage fault
#16	Motor overtemperature fault
#17	Motor Underload fault
#50	4mA fault
#51	External fault

Option Board Requirements:

NXOPTA1, NXOPTA2

TTF-programmable I/O supports any slot and any option board.

Typical Use:

Industrial, HVAC

7.7 Multi-Purpose Control

Description:

Multi-Purpose application is the most flexible All-In-One application. All inputs and outputs are TTF-programmable, so every terminal on every board slot are supported by the application.

Multi-Purpose application is the only All-In-One application, which supports torque control motor control mode.

It also has parameters for the fieldbus data signals. The process data transmitted from the frequency converter to the PLC via fieldbus can be defined with parameters in group G2.9 "FIELDBUS". This definition is done by using the ID-number of the monitored item.

Frequency reference can be selected from either the I/O terminal, keypad, fieldbus or motor potentiometer. Frequency reference from I/O terminal can be as following; voltage input (AI1), current input (AI2) input, AI1+AI2, AI1-AI2, AI2-AI1, AI1xAI2, AI1 Joystick, AI2 Joystick, Min(AI1,AI2), Max(AI1,AI2).

Frequency reference can be adjusted with the fine adjust function. Fine adjust input can be AI1, AI2, AI3, AI4 or fieldbus (Process Data Input 3).

In addition it is possible to select the frequency reference between AI1 and AI2 using digital input or using maximum frequency parameter as frequency reference. (This is recommended in torque control only!)

Multi-Purpose application is typically used in industrial processes, where flexible I/O-configuration or demanding motor control tuning is needed. These kind of applications are complicated vertical and horizontal movements like cranes, lifts, conveyors and cases where torque control is needed.

Application Features:

Programmable frequency reference sources for each control places.

One jogging speed.

7 programmable preset speeds.

Programmable start/stop-logic.

Motor potentiometer controlled frequency reference.

Frequency reference fine adjust input with scaling. (=Offset)

Four TTF-programmable analog inputs with signal range, inversion, filtering and scaling functions.

Joystick function for analogue inputs AI1 and AI2.

Sleep function with delay for analogue inputs AI1 and AI2. (If analogue input signal goes below the limit, the drive will stop.)

Free analog input function. Can be programmed to control current limit, DC-brake current, acceleration/deceleration times or torque limit.

TTF programmable digital inputs.

Two TTF/FTT programmable digital/relay outputs with on/off delay.

TTF programmable digital/relay outputs.

Two output frequency limit supervision function.

Torque limit supervision function.

Reference limit supervision function.

Frequency converter temperature limit supervision function.

On/Off-delayed output for external brake control.

Analogue input limit supervision function.

Three TTF/FTT-programmable analog outputs with offset, filtering, inversion and scaling.

Two frequency ramp profiles and S-shape programming.

DC-brake and flux brake functions.

Three prohibit frequency windows.

Open- and closed loop motor control modes.

Programmable U/f-curve and automatic torque boost.

Parameters for overvoltage and undervoltage controllers.

Motor control mode 2. Selection between two different motor control modes can be made with digital input.

Speed controller parameters for open loop and closed loop.

Current controller parameters in Closed Loop-mode.

Load drooping

Identification

Programmable fieldbus data signals from frequency converter to PLC.

Torque control parameters.

PT100 support. (Max. 3 sensors can be connected.)

Expanded protections; programmable fault response modes for the following faults:

#3	Earth fault
#10,#11	Input/output phase supervision
#15	Stall protection
#16	Motor thermal protection
#17	Underload protection
#29	Thermistor fault
#50	4mA fault
#51	External fault
#53	Fieldbus fault
#54	Slot fault
#56	PT100 fault

Programmable auto restart function for the following faults:

#1	Overcurrent fault
#2	Overvoltage fault
#9	Undervoltage fault
#16	Motor overtemperature fault
#17	Motor Underload fault
#50	4mA fault
#51	External fault

Option Board Requirements:

NXOPTA1, NXOPTA2

TTF-programmable I/O supports any slot and any option board.

Typical Use:

Industrial; cranes, lifts, conveyor, Torque controlled applications

7.8 Pump and Fan Control

Description:

The pump and fan control application is designed to control one variable speed drive and up to four auxiliary motors (E.g. pumps & fans). The PID-controller of the frequency converter controls the speed of the one motor at the time. If more production (pressure or total flow) is needed, the frequency converter will reach the maximum speed. If the production is still not enough, this motor is connected to mains and frequency converter switch over to the next motor on the line and starts regulating that and so on.

Only the necessary amount of devices are running to produce the needed pressure.

The application has two individual control places on I/O-terminal. Place A is the pump and fan control with PID-reference and place B is the direct frequency reference control. The control place is selected with digital input, DIN6.

The application utilizes external contactors for switching between the motors connected to the frequency converter.

The auto-change feature provides the capability of changing the starting order of the auxiliary devices. Auto-change between 2 devices (main device + 1 auxiliary device) is set as a default.

Application Features:

Programmable PID-reference source.

Two PID-reference sources. Selection between these references is done by digital input.

Parameters for the P-, I, and D-terms for the PID-controller.

Sleep function with output frequency limit and delay time supervision. Programmable wake-up limit and wake-up function.

One jogging speed.

Programmable direct frequency reference sources for each control places. (Control place B.)

Two PID-controller acting modes;

[Reference-Actual]=Reverse Acting

[Actual-Reference]=Forward Acting

Two actual value inputs with scaling.

Motor potentiometer for the frequency reference and PID-reference.

Four TTF-programmable analog inputs with signal range, inversion, filtering and scaling functions.

TTF-programmable digital input functions.

TTF-programmable digital and relay output functions.

Two output frequency limit supervision function.

Torque limit supervision function.

Reference limit supervision function.

On/Off-delayed output for external brake control.

Frequency converter temperature limit supervision function.

Analogue input supervision function.

Three TTF/FTT-programmable analog outputs with offset, filtering, inversion and scaling.

Two frequency ramp profiles and S-shape programming.

DC-brake and flux brake functions.

Three prohibit frequency windows.

Open- and closed loop motor control modes.

Programmable U/f-curve and automatic torque boost.

Parameters for overvoltage and undervoltage controllers.

PT100 support. (Max. 3 sensors can be connected.)

Pump&Fan control parameters:

Auxiliary device start/stop frequency limits.

Auxiliary device start/stop delay times.

Speed step when changing the auxiliary device.

Enable/disable PID-control.

Programmable output pressure drop function. Can be used e.g. in pressure increase stations, where the output pressure must be decreased when the input pressure goes below a certain limit.

Auto-change function to vary the starting order of the auxiliary drives.

Special units for the actual value display. (28 different units.)

Expanded protections; programmable fault response modes for the following faults:

#3	Earth fault
#10,#11	Input/output phase supervision
#15	Stall protection
#16	Motor thermal protection
#17	Underload protection
#29	Thermistor fault
#50	4mA fault
#51	External fault
#53	Fieldbus fault
#54	Slot fault
#56	PT100 fault

Programmable auto restart function for the following faults:

#1	Overcurrent fault
#2	Overvoltage fault
#9	Undervoltage fault

#16	Motor overtemperature fault
#17	Motor Underload fault
#50	4mA fault
#51	External fault

Option Board Requirements:

NXOPTA1, NXOPTA2

TTF-programmable I/O supports any slot and any option board.

Typical Use:

Pumps and fans