

Software Change Note ARFIF106

Grid Converter + General Grid Code

Application: ARFIF106
Application Name: Grid Converter + General Grid Code
Verbal Name: GC + GGC
Manual: DPD01978A

Note 1: Frame size FR4 will be operational in uGrid and Island mode without a license key but this frame size is only for testing and demonstration purposes, not for real production.

Note 2: Drive Grid Code compliance requires that drive is the one controlling the MCB.

Note 3: Grid Code functionality requires that OPT-D7 option board is used.

Note 4: For UL use only version ARFIF106 V103 and system software NXP2V200

Update Note 1: This application parameters are not kept backwards compatible if new features or improvements would be difficult to implement by doing so. Read this change note and chapter "Compatibility issues in parameters between versions" from manual before updating the application.

Update Note 2: It's recommended to use compare function for parameter changes when updating application, especially in cases when version number change is considerably high. Application is constantly developed; this includes changing parameter default values, and if parameters are directly downloaded to drive improved default values may be lost.

ARFIF106V129

Replaced Application: ARFIF106V128
Used Firmware version: NXP5.01
System Software requirement: NXPV205
Released to field: -
Used in production: -
Changes in new application:

- **Compatibility Note:** ID3322 has two instances in parameters
 - P2.17.4.2 LF MaxChangeRate ID3322
 - P2.17.8.14 LF MaxChangeRate ID3322
 - These has been now separated to two separate parameters
 - P2.17.4.2 LF MaxChangeRate ID3322
 - P2.17.8.14 LF MaxChangeRate ID3514
- **Compatibility Note:** ID3291 has two instances in parameters
 - P2.17.9.3.1 UV High Corner ID3291
 - P2.17.9.5.4 UV High Corner ID3291
 - These has been now separated to two separate parameters
 - P2.17.9.3.1 UV High Corner ID3291
 - P2.17.9.5.4 UV High Corner ID3515
- **Compatibility Note:** ID3292 has two instances in parameters
 - P2.17.9.3.2 UV Low Corner ID3292
 - P2.17.9.5.5 UV Low Corner ID3292
 - These has been now separated to two separate parameters
 - P2.17.9.3.2 UV Low Corner ID3292
 - P2.17.9.5.5 UV Low Corner ID3516
- **Compatibility Note:** ID3293 has two instances in parameters
 - P2.17.9.3.3 UV Reac.MaxRef ID3293
 - P2.17.9.5.8 UV Reac.MaxRef ID3293
 - These has been now separated to two separate parameters
 - P2.17.9.3.2 UV Reac.MaxRef ID3293
 - P2.17.9.5.8 UV Reac.MaxRef ID3517

- **Compatibility Note:** ID3294 has two instances in parameters
 - P2.17.9.3.4 UV Bi Reac. Ref ID3294
 - P2.17.9.5.9 UV Bi Reac. Ref ID3294
 - These has been now separated to two separate parameters
 - P2.17.9.3.4 UV Bi Reac. Ref ID3294
 - P2.17.9.5.9 UV Bi Reac. Ref ID3518
- **Compatibility Note:** ID3300 has two instances in parameters
 - P2.17.9.4.1 OV Low Corner ID3300
 - P2.17.9.6.4 OV Low Corner ID3300
 - These has been now separated to two separate parameters
 - P2.17.9.4.1 OV Low Corner ID3300
 - P2.17.9.6.4 OV Low Corner ID3519
- **Compatibility Note:** ID3301 has two instances in parameters
 - P2.17.9.4.2 OV Max Reactiv ID3301
 - P2.17.9.6.8 OV Max Reactiv ID3301
 - These has been now separated to two separate parameters
 - P2.17.9.4.2 OV Max Reactiv ID3301
 - P2.17.9.6.8 OV Max Reactiv ID3543
- **Compatibility Note:** ID3346 has two instances in parameters
 - P2.17.13.3.3 MaxCosRef ID3346
 - P2.17.13.4.5 MaxCosRef ID3346
 - These has been now separated to two separate parameters
 - P2.17.13.3.3 MaxCosRef ID3346
 - P2.17.13.4.5 MaxCosRef ID3544
- Grid Code settings xlsx has been updates accordingly above.
 - Added macro that ust file can be created from xlsx.
 - Setting to ust file are copied from E8 to E278
- Line Frequency Change rate protection function could go in to state where Grid Code fault was not possible reset when using low values (<0,05) Hz, fixed.

ARFIF106V128

Replaced Application: ARFIF106V127
Used Firmware version: NXP5.01
System Software requirement: NXPV203
Released to field: -
Used in production: -
Changes in new application:

- Added datalogger selection 5
 - Signal selected for monitoring grid code situations.
- Added two Klixon inputs F66 Klixon
 - P2.4.2.28 Klixon In 1 ID780
 - P2.4.2.29 Klixon In 2 ID781
 - P2.9.1.13 Klixon Response ID782
- Added Ambien temperature monitoring. F88 Ambien Temp
 - P2.4.2.31 Ambien Temp ID783
 - P2.9.1.14 Ambien Temp Respond ID784
- Added input switch monitoring F55 Input Switch
 - P2.4.2.30 Input Switch ID1209
 - P2.9.1.15 Input Switch Respond ID785
- Added P2.4.1.2 Input Inversion ID1091
 - B05 = +16 = INV Klixon input 1
 - B06 = +32 = INV Klixon input 2
 - B07 = +64 = INV High Ambient temperature
 - B08 = +128 = INV Input Switch

ARFIF106V127

Replaced Application: ARFIF106V126

Used Firmware version: NXP5.01

System Software requirement: NXPV203

Released to field: -

Used in production: -

Changes in new application:

- DC Voltage reference was ramped with DC Ref follower ramp rate when PI Power controller was active even if DC Ref follower function was not, fixed.
- New selection to P2.2.3.5 DC Ref Mode
 - -1 / Direct Iq Ref
- Added F60 Cooling fault to Fault Word 2 B11
- Cooling monitoring group G2.9.11 added
 - P2.9.11.1 Cooling Fault Delay
 - P2.9.11.2 Cooling Fault Response

ARFIF106V126

Replaced Application: ARFIF106V125

Used Firmware version: NXP5.01

System Software requirement: NXPV203

Released to field: -

Used in production: -

Changes in new application:

- Grid Nom Voltage is locked from changes during run state.
- Power PI Controller was inoperative if OPT-D7 was not connected to the drive.
 - This is a protection function while there is a LVRT situation.
 - Power PI Controller enabled when OPT-D7 is not connected to the drive.
- Added Quick Stop function response No indication.

ARFIF106V125

Replaced Application: ARFIF106V124
Used Firmware version: NXP5.01
System Software requirement: NXPV203
Released to field: -
Used in production: -
Changes in new application:

- **Compatibility note:** Reversed from V124, no longer active by default.
 - Faster ramp rate for internal DC Reference active by default.
 - PI Power controller uses less filtered active current signal by default
 - No need to set Control Options 2 B3 for backwards compatibility.
- G2.17.10 Reactive Power reference were not reset to zero when G2.17.15 Limited Grid Support function was active, fixed.
- Added P2.17.15.4 Voltage Level High for Limited Grid Support.
- On power up situations drive may have triggered Grid Code Frequency supervision when trip delay times below 100 ms were used, fixed.

ARFIF106V124

Replaced Application: ARFIF106V123

Used Firmware version: NXP5.01

System Software requirement: NXPV203

Released to field: -

Used in production: -

Changes in new application:

- **Compatibility note:** Faster ramp rate for internal DC Reference active by default.
 - Possible to disable Control Options 2 B3
- **Compatibility note:** PI Power controller uses less filtered active current signal by default.
 - Possible to disable Control Options 2 B3

ARFIF106V123

Replaced Application:	ARFIF106V122
Used Firmware version:	NXP5.01
System Software requirement:	NXPV203
Released to field:	-
Used in production:	-
Changes in new application:	

- P2.7.8 Control Options 1 ID1707
 - B08 Disable floating DC Reference removed. Selection is behind P2.2.3.5 DC Ref Mode
- P2.2.3.3 DVC RefFilter TC parameter removed.
- PI Power controller operation changed so that given DC Voltage reference is not followed anymore when P2.2.4.12.1 PID Power Act. ID1905 is active. Drive will follow Actual DC Voltage with ramp rate defined by ID1678. This enables to set PID DC Low and High (ID1903 & ID1904) more lower level thus reducing PI controller overshoot. If rapid power responses are not needed PI limit can be set to correspond battery's natural drooping.
 - Added P2.2.3.3 DCV PIPoFolRate ID1678 (DC Voltage PI Power Follower Rate)
- ID3303 and 3329 renamed to Log In and Log Out.
- FB DC Voltage limits replaced by normal DC Reference limits.
- Added Control Options B8 to disable double sampling from Grid Code functionality.
- uGrid and Island mode over and under voltage limits will limit DC Voltage reference, thus harmonizing different modes under and over voltage behavior.
- FRT timer parameter order reversed so that parametrization is started from top instead of bottom.
- Added maximum frequency rate change parameter to Anti-Islanding group. Keeping original also in its place.
- Line OK limits moved to ReConnection group.
- Reactive handling divided to two different groups. Reactive Current and Reactive Power groups.
- Power handling also divided to groups. Power Limits and Power References.
- DC Voltage Reference minimum limit set to 50 %. Giving more flexibility to set DC Nominal Voltage parameter.

ARFIF106V122

Replaced Application:	ARFIF106V121
Used Firmware version:	NXP5.01
System Software requirement:	NXPV203
Released to field:	-
Used in production:	-
Changes in new application:	

- Added G2.17.11.10 Q(P) Curve
 - Reactive based on active power.
- Added new State Machine P2.10.35 Selection 3, new functions including:
 - B1: MCB Breaker closing enable
 - Also opening when setting Control Options 2 B0
 - B2: Quick Stop
 - B4: Output power limit to zero.
 - B5: Disable increase of power.
 - B6: Input power limit to zero.
- Added new default in FB Status Word for bits B11 trough B14
 - B11: MCB is controlled to be closed.
 - B12: MCB Feedback, High = Closed
 - B14: Charging Control is active.
- In same cases grid codes are needed to keep active while drive is operating in uGrid mode, in a such a case:
 - Grid Code functions will not set AFEOptions 1. B13 if drive is not in AFE mode.
- D2 Synch follower did not close MCB, fixed.
- Added P2.17.16.15 Fast Reactive Voltage Compensation.
 - Compensated current reference to be power reference.
- Added Control Options 2 B1.
 - Active current monitoring signal negated.
- DC Voltage reference is limited by over and under voltage limits.

ARFIF106V121

Replaced Application:	ARFIF106V120
Used Firmware version:	NXP5.01
System Software requirement:	NXPV203
Released to field:	-
Used in production:	-
Changes in new application:	

- Added new Dynamic Grid Support function G2.17.11.9.
- Grid Code license not needed for FR4 unit.
- F80 has sub code
 - A2; Fault from charging control
 - A3; Fault from DC not high enough.
- Power PI Controller Ramp rate format can be changed with parameter.
 - Internal DC Ref ramp rate is removed when using faster ramp rate format than #,##.
- Firmware update 5.01
- Added DC Measurement Offset parameter
- Grid Code State, added B22: Dynamic Grid Support Active.
- Datalogger settings are automatically changed based on control and operation mode.
- High Freq Current limit changed to Bridge Current limit and manual updated to better explain the function.
- Added selection to P2.17.3 Enable Grid Code 1 / Enable, monitoring.
 - Used when drive in islanding mode and needed to monitor when drive can connect back to the grid.
- Added P2.5.7.6 Grid Code Breaker, possible to select if MCB 1 or NET contactor is controlled by Grid Code functionalities.
- Momentary cessation default changed to -1 % which means disabled.
 - Was limiting power even when power limit was set to 300 %
- Code optimization.
- Power PI controller FRT recovery Kp/Ti is delayed 200 ms so that initial voltage drip that affect active current does not destabilize Power PI controller.
- DC Voltage reference is freezed in LVRT (< 50 % Un) from unfiltered Line Voltage thus Power PI controller returns power faster to initial level after the LVRT is over.

- This was previously from internal FRT status, depending setting power control was freezed between 99-51 % of U_n even if control can be maintained.
- If PI controller was at max/min limit Power limits were changed to pure DC control limits, this was affecting Power recovery after FRT.
 - Pi controller is kept active and anti-windup is done in reference and PI logic.
- Power limiting principle changed (recoded), new mode is more stable even when line voltage has lot of disturbance.
 - Removed P_PowerFollowerHysteresis
 - High Frequency Power Limit function
 - Power limiting based on high voltage.
 - Low frequency charging power limit
 - Output Power increase rate limiter function.
 - Input Power increase rate limiter function.
 - Normal Power Ramp up uses MotPot principle for limit instead of RAMP1
 - For Output and Input power limits ramping.
 - Function limit was not calculated during FRT and Reconnection, now updated but values are locked with MotPot function inputs.
- Control Options 2 B1 will negate Active Current monitoring value.
- Normal Power ramp rate will also limit ReConnection power ramp.
 - If DC Ref was given after ReConnection normal power ramp was used until ReConnection power limit was reached.
 - ReConnection power ramp started from modulation assuming power reference is already there.
- During FRT normal power ramp up limits are forced to maximum of Grid Code limits.
- Liquid cooled units 2 s current enabled.
 - Use 15 % margin for liquid cooled units.

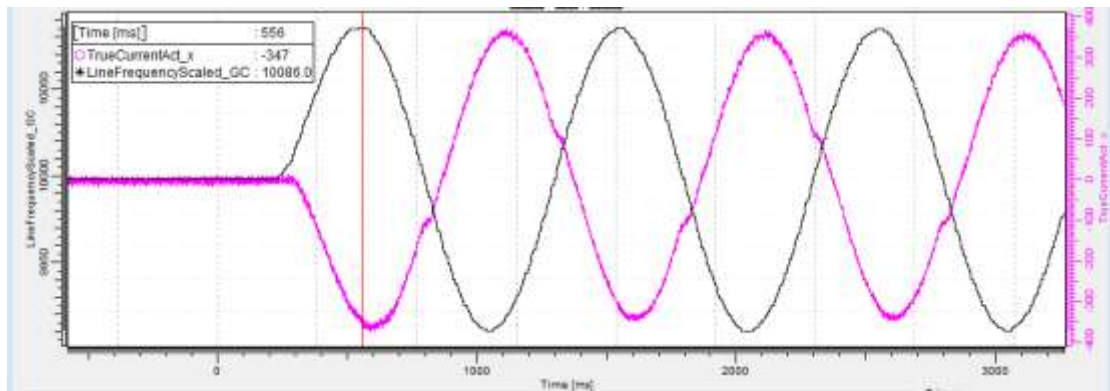
I_{SCC}	Default	Max P2.6.1.4 = 0	Max P2.6.1.4 = 1
Current Limit Air Cooled	I_L	$I_H * 1,50$	I_S
Current Limit Liquid Cooled	I_{th}	$I_{th} * 1,05$	$I_{th} * 1,25$

ARFIF106V120

Replaced Application: ARFIF106V117
Used Firmware version: NXP4.99
System Software requirement: NXPV202
Released to field: -
Used in production: -
Changes in new application:

- Grid Code state B22 & B29 had same information, B22 removed.
- Code optimization.
 - All MotPot functions uses new optimized MotPot function.
 - Power PI Controller optimized.
- P2.17.7.1 Voltage Monitor ID3364 options 3 / Separate Average and BiPhase Fast voltage monitor removed.
 - Not needed in any of the Grid Codes.
- P2.17.11.6.3 & P2.17.11.5.6 section 2 removed, not needed.
- Low Frequency Charge Power limit did not work, fixed.
 - Is not used any of the Grid Codes.
- P2.11.1 Control mode 5 was same as 4, 5 changed to uGrid – AFE
- Added P 2.17.12.1.4 PowerRefRamp
 - Defines ramp for Low and High frequency power references.
- Internal DC Voltage reference ramp rate by passed when PI Power Reference ramp rate faster than 200 %/s.
- Minimum DC Voltage Ramp rate was 0, changed to -10n negative values bypass ramp function.

- Added Automatic power reference control for under and over frequency
 - Added G2.2.4.13 High Frequency Power Reference
 - Added G2.2.4.14 Low Frequency Power Reference
 - This function can be set to react automatically frequency variation in a grid.
 - For over frequency function can reduce power or even reverse power direction if parametrized so.



ARFIF106V117

Replaced Application: ARFIF106V115

Used Firmware version: NXP4.99

System Software requirement: NXPV202

Released to field: -

Used in production: -

Changes in new application:

- AFE Power PID Reference ramp changed to 50 %/s by default.
 - Gives similar response as default Grid Code settings when grid codes are activated.
- uGrid Base Current Reference ramp function block changed, setting negative value will bypass ramp function.
- Low DC Operation did not close MCB, fixed.

ARFIF106V115

Replaced Application: ARFIF106V114
Used Firmware version: NXP4.99
System Software requirement: NXPV202
Released to field: -
Used in production: -
Changes in new application:

- Different Power PI gains when returning from FRT for 1 second time.
 - Added P2.2.4.12.12 PID FRT Gain
 - Added P2.2.4.12.13 PID FRT Ti
 - P2.2.4.12.2/3 can be kept default.
- Normal power ramp up rate bypassed when returning from FRT about 2 second.
 - Normal Power Ramp Up rate can be kept default.
- Added P2.17.11.6.9 OV Reac.Start V
- Added option 2 to P2.17.11.5.3 UV PowrLogInMode and P2.17.11.6.3 OV PowrLogInMode. This mode support faster negative sequence reactive current.
- Added support for limited Dynamic Grid Support
 - Reactive and active power are forced zero below certain line voltage level.
 - G2.17.15 Limited Grid Support

ARFIF106V114

Replaced Application:	ARFIF106V113
Used Firmware version:	NXP4.99
System Software requirement:	NXPV202
Released to field:	-
Used in production:	-
Changes in new application:	

- Added F80 Charge fault to Fault Word 2 B01
- Undervoltage controller maximum limit changed from 99 % to 320 %.
- Residual voltage limit needed to activate separately for three phase faults.
 - Activation with Control Options 2 B7
- F60 Cooling fault, warning is not stored to history if ChargeSwState is open (No DC voltage).
- Power PI-controlled is released from LVRT based on grid voltage not from delayed state monitor. This enables faster power return after grid fault.
- Monitoring values DC Voltage Ref did not show PI Power controller and DC Ref Offset affects, fixed.
- Added P 2.17.11.5.10 UV Reac.Start V
 - Enables separate reactive curve than log in voltage.
- Firmware updated to FW4.99,
 - Requires system software V202
- Temperature tripping limit increased in certain units.
 - Air cooled 690 Vac units with current ratings:
 - 125, 144 170, 208, 261, 325, 385, 416, 460, 502, 590, 650, 750, 820, 920, 1030, 1180, 1500, 1900, 2250.
 - Air cooled 500 Vac units with current ratings:
 - 168, 205, 261, 300, 385, 460, 520, 590, 650, 730, 820, 920, 1030, 1150, 1300, 1450, 1770, 2150, 2700.
- 690 Vac unit possible ready level levered to 540 Vdc.
- DC Voltage Reference handling at 1 ms time level.
 - Use FBSpeedReference to gain fastest response for DC Voltage Reference control.

- Process Data Inputs 1-8 moved to 1 ms time level.
 - Use Fast Fieldbus support to gain maximum benefit.

ARFIF106V113

Replaced Application:	ARFIF106V112
Used Firmware version:	NXP4.94
System Software requirement:	NXPV200
Released to field:	-
Used in production:	-
Changes in new application:	

- Analogue Output functions harmonization.
 - **Compatibility note:** P2.5.7.2 and P2.5.7.3 FreqScaleMinAO and FreqScaleMaxAO parameters removed.
 - **Compatibility note:** Analogue output function 12 operation changed. Shows now frequency error to set grid frequency.
 - Selection 6 in analogue outputs was Reactive current, was supposed to be active current bidirectional, fixed.
 - Added analogue output selection 14 bidirectional reactive current.
- DC Voltage limit Controller and uGrid Current limit controller defaults changes.
 - P2.6.5.5 DCLimControl Kp = 50, new default = 100
 - P2.6.5.6 DCLimControl Ti = 50 ms
 - P2.6.4.4 Current Limit Kp = 100, new default = 70
 - P2.6.4.5 Current Limit Ti = 32
- Zero Q Control will start from the grid voltage like selection 0 = Start Zero Q.
 - This will eliminate Q spike that was there before controller was able to remove reactive.
- Zero Q control was limited later by output voltage limits, by default it limited field weakening point 90 % and 120 % even if the drooping was higher
 - Added P: ZeroQVoltaMaxAdjust
 - Moved to outside LIMIT function block
- Start Q Zero will work even if Grid Voltage controller is active.
- Added Voltage Control Bits to FB uGrid Control Word
 - B7: Voltage Down
 - B8: Voltage Up
 - B9: Reset Voltage MotPot

- Grid Code license and Not OPT-D7 board will make separate faults rather than Grid Code sub codes.
- Line OK Delay parameter maximum increased from 30 s to 60 s
- Added B29, B30 and B31 to Grid Code Status Word.
 - b29 Line Freq Low Power Ref
 - b30 Line Freq High Power Ref
 - b31 Line Voltage High Power Ref
- Added Reconnection Power ramp rate also to charging side.
- Added normal ramp rate limiting for power in input power direction also.
- PvsOF and PvsUF, if frequency returned again to log in level while power was still ramping limitation was not working correctly.
 - Limit was done from at the power of that time, now new power is not allowed until function is executed completely. i.e. power ramped back to original while frequency keeps outside log in area.
- Added Reactive Reference MotPot reset function.
 - Default; Reset at stop.
- Added P2.7.11.9 Mod#2 Opt. DPWM
 - Enabled by default for software modulator #2. Takes benefit of software modulator #1 and software modulator #2 when software modulator #2 is selected.
 - This option is available when with system software V202 or newer.

ARFIF106V112

Replaced Application:	ARFIF106V111
Used Firmware version:	NXP4.94
System Software requirement:	NXPV200
Released to field:	-
Used in production:	-
Changes in new application:	

- Low Frequency Power Reference G2.17.12.6
 - Added Power Increase Log Off Frequency
 - Added Power Increase Off Ramp
 - Added Power increase Off Delay
 - Added Power Increase Low Frequency
- Added G2.17.12.7 High Freq Power Reference Function
- Added G2.17.12.8 High Voltage Power Reference Function
- Added P2.17.12.1.3 GC Min Power
 - Limit Charging power that Grid Code functions can give.
- Removed P2.9.1.14, automatic solution will be implemented when system software V202 is released.
- When forced PI power control was activated from Grid Code, PI Actual was not used as reference if PI Power controller was not active prior Grid Code forced Power PI controller active.

ARFIF106V111

Replaced Application: ARFIF106V108

Used Firmware version: NXP4.94

System Software requirement: NXPV200

Released to field: -

Used in production: -

Changes in new application:

- Added V1.6.3 License Grid Code, indicating status for Grid Code license.
- Grid Cade license sub code changed from A1 to F63
- DO: D7 synchronized and Close Net Contactor stay in high state when External grid synchronization is disabled while outputs were high.
 - Fixed, outputs are forced low state when function is disabled.

ARFIF106V108

Replaced Application: ARFIF106V107

Used Firmware version: NXP4.94

System Software requirement: NXPV200

Released to field: -

Used in production: -

Changes in new application:

- Start commands are reset when ChargeSwitchState goes false.
 - MCB opening can't be used because Grid Codes will also open the MCB.
- Start Commands were not reset based on Control Place, fixed.
- Rising edge start command are accepted if charge switch is closed or drive own Charge control is used.
- F80 if DC above under voltage fault level but below closing level.
- Panel Auto Backup Disabled.

ARFIF106V107

Replaced Application: ARFIF106V106

Used Firmware version: NXP4.94

System Software requirement: NXPV200

Released to field: -

Used in production: -

Changes in new application:

- Removed unused parameters from keypad, manual updates.

ARFIF106V106

Replaced Application: ARFIF106V105

Used Firmware version: NXP4.94

System Software requirement: NXPV200

Released to field: -

Used in production: -

Changes in new application:

- Added V1.2.17 DC-Link Current [A] ID72
- Added V1.2.18 DC-Link ActCurr [%] ID1158
- Added Status Word B11, Short Circuit Mode Active.
 - Requires NXPV201
- V1.2.3 Used Current Ref not updated in all new reference modes, fixed.
- NET synchronization parameter reordering.
- If unsupported P2.10.38 Control Slot Select was requested system load may have increased. Now selection is set internally only once.

ARFIF106V105

Replaced Application: ARFIF106V104

Used Firmware version: NXP4.94

System Software requirement: NXPV200

Released to field: -

Used in production: -

Changes in new application:

- High Frequency Power limit function was not able to limit below nominal frequency, changed so that function active when setting above frequency higher than 50 %.

ARFIF106V104

Replaced Application: ARFIF106V103

Used Firmware version: NXP4.94

System Software requirement: NXPV200

Released to field: -

Used in production: -

Changes in new application:

- Added Fault 77 DC Ground Fault.
 - Added Digital input for monitoring P2.4.2.28 DC Ground Fault.

ARFIF106V103

Replaced Application:	ARFIF106V101
Used Firmware version:	NXP4.94
System Software requirement:	NXPV200
Released to field:	-
Used in production:	-
Changes in new application:	

- Use only this version for UL and system software NXP00002V200
- Factory Default was missing some parameters, added.
- Several System Load reductions changes.
- Reconnection power up ramp was released before power PI controller reference was released. Depending on PI setting power increase could be faster than reconnection ramp when Pi reference was released.
 - Own delay parameter for Reconnection RAMP release.
 - Default set to longer than PI Power release delay.
 - Added own delay parameter for PI Power controller start delay.
 - Default set to shorter than Reconnection power limit ramp release.
- Reactive current priority selection.
 - Normal
 - Active
 - Reactive
 - CosPhii Reference
 - Reactive and CosPhii Reference
- Bi-Phase status B28 was showing three phase fault also, fixed.
- Possible activate separately Bi-Phase monitoring function, was previously included in normal tripping.
- More selection for voltage monitoring types.
 - Bit selections are removed.
- Added Frequency Monitor type selection.
 - Back word compatibility for CERE tests.
- Normal power ramp-up rate when using fast is also now including slow Iq current.
- Added delay to High Voltage power limit release.
- Added ramp rate for High voltage power limit release.

- Line Frequency Change rate executed every 10 ms.
- Datalogger VoltageAct_dc -> DCVoltageUnFilteredW
- MCB Feedback as default A.4
- Added MCB Close Mode 3.

ARFIF106V101

Replaced Application: ARFIF106V097

Used Firmware version: NXP4.94

System Software requirement: NXPV197

Released to field: 22.3.2019

Used in production: -

Changes in new application:

- Factory Default was missing some parameters, added.
- PI Power Ti default changed to 500 ms from 200 ms
- New calculation for phase rms voltages.
 - Old mode can be activated with Grid Code options B1.
- Several System Load reductions changes.
- Bi-Phase voltage requires that also Negative Sequence Voltage has 7,5 Vac difference.
 - Sometimes tri-phase fault was identified as bi-phase fault.
- Increased frequency tripping limits to 1200 s

ARFIF106V097

Replaced Application:	ARFIF106V095
Used Firmware version:	NXP4.94
System Software requirement:	NXPV197
Released to field:	13.3.2019
Used in production:	-
Changes in new application:	

- Added power limits for every voltage limit.
- Added Low Voltage level 4 tipping function.
- MCB Opening delay reduced by 50 ms.
- Voltage levels power limit has now option to set power limit ramp down rate.

ARFIF106V095

Replaced Application: ARFIF106V089

Used Firmware version: NXP4.94

System Software requirement: NXPV197

Released to field: -

Used in production: -

Changes in new application:

- Using Isochronous for Grid Converter was affecting Anti-Islanding function, fixed.
- Several system load reduction code changes.
- Added off delay for fast frequency monitoring.
 - Fast is activated automatically when delay time is below 500 ms.
- Added Reaction time parameter for Voltage and frequency monitoring.
- Minimum tripping times limited internally that there will be no conflict with Off delays.

ARFIF106V089

Replaced Application: ARFIF106V088

Used Firmware version: NXP4.94

System Software requirement: NXPV197

Released to field: -

Used in production: -

Changes in new application:

- Own tripping limits for Anti-Islanding.
- F96 THD is not active by default.
- Added MotPot Hz/Power reset modes AFE Mode, AFE or Stop.
- Added FB Analogue Output, was missing as monitoring variable, was in AO functions.
- Added External trip Grid Code Normally Closed DI
- Power limiting goes to Power PI controller directly if active, Limits to firmware goes with higher hysteresis.
- New logic for By-Phase fault detection
 - 100 ms faster than previous method.

ARFIF106V088

Replaced Application: ARFIF106V087

Used Firmware version: NXP4.94

System Software requirement: NXPV197

Released to field: -

Used in production: -

Changes in new application:

- Added function to reset Power MotPot when drive is in stop state.
- Added digital input to reset Power MotPot function
- Added OPT-BH support.
- Added Brake Chopper Support.

ARFIF106V087

Replaced Application: ARFIF106V079
Used Firmware version: NXP4.94
System Software requirement: NXPV197
Released to field: -
Used in production: -
Changes in new application:

- Power PI Controller Reference max ramp rate to 320 %/s
 - Setting negative will bypass the ramp.
- GC; Power Ramp rate moved to G2.17.12
- Added P2.17.2 Set Grid Code to factory defaults.
- Added P2.17.8.14 FreqFiltering, possible to select low filtered frequency signal.
- Added P2.17.15.9 LineFreqLow TC.
- Line Frequency tripping limit max time increased from 120 s to 330 s.
- Power Ramp rate will use low filtered signal when ramp rate is faster than 50 %/s.
- Added delay parameter for High Frequency Power Limit P2.17.12.2.10
- Added delay parameter for Low Frequency Charge Power limit P2.17.12.5.7.
- Power PI controller reference limiter is moved after the reference ramp function.
- Q U Power uses High filtered line voltage.
- Added XY plot for reactive reference based on voltage.
 - Free programmability.
- When frequency was high Power ramp rate was not set parameter, fixed.
- Power PI controller limit hysteresis increased from 0,3 % to 1,0 % to avoid over shoots when any power limit function is active from Grid Code.
 - Added as parameter.
- Power PI Controller stops controlling when error is less than 1,5 %, delay to stop is 5 times the set integration time.
 - Added as parameter.
- Simultaneous Quick Stop command and MCB Breaker feedback loss were causing F64 unnecessarily, fixed.

- Execution order changed.
- Status Word B9 was not working when MCB pulse control was used, fixed.
- Only first start synchronization to grid is made with soft synch, if activated.
- AFE Options by default 544, Soft Synch.
- MCB Open command given always when there is F64 MCB State Fault.
- MCB 2 Control, Charging was started regardless of feedback, fixed.
- Pressing stop button 3 second when in keypad control, will open the MCB.
- In PC Control Coasting stop will open the MCB, and if Reverse command in on Costing will open MCB regardless of control place.
- Normal Power ramp up was limiting power on low frequency when ramp rate > 50 %/s
 - Ramp function changed to use filtered signal in case of low frequency power increase active.
- Added maximum power limit in Grid Code mode.
- High Voltage power limit will use high filtered voltage when slope is more than 50 %/%
- High voltage power limit did not have Power Follower hysteresis included in functionality, fixed.
- When voltage compensation was used for Power PI function High Voltage Power limit was calculating too low power limit when exceeding voltage limit.
 - High Voltage power limit is reverse compensated if Power PI function with voltage compensation is used at the same time.
- Power PI voltage compensation is moved after the reference ramp function.
- If separate OK limits were higher than tripping limit Grid Code did not receive reset, fixed.
- If separate OK limits are used also tripping limit are monitored for Grid Code Reset.
- When voltage was above OK limit but below tripping limit, drive was able to start, fixed.
- Added software over current trip limit (F1 S4) P2.6.1.8 OverCurrTripLim.
- Island mode voltage controller uses #,# accurate voltage controller.
 - Voltage controller changed to 32-bit version.

- Added tripping function for high THD
- Active power drooping is possible to set negative.
- Added 4 mA fault functions.

ARFIF106V079

Replaced Application: ARFIF106V078
Used Firmware version: NXP4.90
System Software requirement: NXPV197
Released to field: -
Used in production: -
Changes in new application:

- **Minor Combability issue**
 - Phase Voltages ID number changed
 - Line L1-L2 2203 -> 3203
 - Line L2-L3 2204 -> 3204
 - Line L3-L1 2205 -> 3205

ARFIF106V078

Replaced Application: ARFIF106V076

Used Firmware version: NXP4.90

System Software requirement: NXPV197

Released to field: -

Used in production: -

Changes in new application:

- Over voltage and under voltage reactive references are separated from common parameters.
- Line Voltage default tripping delay changed to 50 ms.
- Line Frequency default tripping delay changed to 50 ms.

ARFIF106V077

Replaced Application:	ARFIF106V076
Used Firmware version:	NXP4.90
System Software requirement:	NXPV197
Released to field:	-
Used in production:	-
Changes in new application:	

- Added Line Voltage low 3, with a power limit when over voltage.
- Line Voltage monitoring mode made selectable
 - Individual phase monitoring
 - Average Voltage monitoring.
- Added Line Frequency High 3 monitoring.
- Added Line Frequency Low 3 monitoring.
- If Lock Out Values are not given, internally used 1 % lower or higher value for locking out from function starting point.
- Base Current Reference can be selected to be voltage compensated.
- Added linear voltage mode for Power Lock In Lock Out reactive injection.
- Added High filtered voltage for Power Lock In Lock Out linear reactive current reference.
- Added Lock Out function to 10 min average voltage monitoring.
- High Frequency Power limit has now second delay that can be used to limit power increase higher than original power was when frequency limit was exceeded.
- 10 min average trip logic moved to 5 ms time level.
- Added delay parameter for 10 min average voltage monitoring for tripping.
- Added B14 to Line State, indicating when 10 min average value is above set limit.

ARFIF106V076

Replaced Application: ARFIF106V075

Used Firmware version: NXP4.90

System Software requirement: NXPV197

Released to field: -

Used in production: -

Changes in new application:

- Line Voltage High 3, with a power limit when over voltage.
- Added residual voltage monitoring for F91 Three phase fault.
- Added IU rms ID39, IV rms ID40 and IW rms ID41 monitoring signals. 1 second linear filtering to System Rated Current.

ARFIF106V075

Replaced Application: ARFIF106V074
Used Firmware version: NXP4.90
System Software requirement: NXPV197
Released to field: -
Used in production: -
Changes in new application:

- Reactive reference with power lock without giving correct Lock Out Voltage was resulting in abnormal behavior, fixed.
- Voltage compensation added to all Grid Code reactive reference that are not used in zero voltage dips.
- Minimum voltage compensation limited to 50 % voltage.
- When grid codes were activated but drive was in Island or uGrid mode with Grid Code tripping active, starting to Island or uGrid mode was not possible, fixed.
 - Same situation when OPT-D7 installed but not wired.
- If Grid Code is activated and OPT-D7 is not installed drive will trip to Grid Code fault A15.
- Power limits from Grid Code disabled if Grid Code not running

ARFIF106V074

Replaced Application: ARFIF106V069

Used Firmware version: NXP4.90

System Software requirement: NXPV197

Released to field: -

Used in production: -

Changes in new application:

- Added Stop Power ramp also for input power limit.
- Added Minimum selector for Low Frequency Charging power limit.
- Added voltage compensation for low and high voltage power limits.
- Low frequency power limit improvements.
- ID numbers updated to different area for NCDrive.
- Added more reference point for Cos Phii control.
- Delayed DO ID.Bit Control maximum to 4000,15

ARFIF106V069

Replaced Application: ARFIF106V066
Used Firmware version: NXP4.90
System Software requirement: NXPV197
Released to field: -
Used in production: -
Changes in new application:

- **Minor Combability issue**
 - CosPhii mode parameter added.
- Added Max Cos Phii Ref based on active current.
- Low voltage charging power limit
- Low frequency charging power limit function
- Added 10-minute average high voltage trip function.
- Added FRT Enable where both limits can be active at the same time.

ARFIF106V066

Replaced Application:	ARFIF106V065
Used Firmware version:	NXP4.90
System Software requirement:	NXPV197
Released to field:	-
Used in production:	-
Changes in new application:	

- Grid Code; Added Q(U) Reactive Power control.
- Phase 3 Air Cooled testing completed.

ARFIF106V065

Replaced Application: ARFIF106V064

Used Firmware version: NXP4.90

System Software requirement: NXPV197

Released to field: -

Used in production: -

Changes in new application:

- Grid Code; Restarting was not working when setting voltage limits were set to zero (disabled), fixed.

ARFIF106V064

Replaced Application: ARFIF106V063

Used Firmware version: NXP4.90

System Software requirement: NXPV197

Released to field: -

Used in production: -

Changes in new application:

- Grid Code; Reconnection power ramp up rate default to 20 %/s
- Grid Code; Normal operation power ramp up rate 50 %/s
- W91 disabled also if F91 is disabled.
- High Frequency Power Limit dead time removed.
- High Frequency power limit defined by Slope %/Hz

ARFIF106V063

Replaced Application:	ARFIF106V062
Used Firmware version:	NXP4.90
System Software requirement:	NXPV195
Released to field:	-
Used in production:	-
Changes in new application:	

- Some Grid Code functionalities are automatically disabled when drive is not in AFE mode.

ARFIF106V062

Replaced Application: ARFIF106V059

Used Firmware version: NXP4.90

System Software requirement: NXPV195

Released to field: -

Used in production: -

Changes in new application:

- Tripping to individual phase voltages is moved being Grid Code Options B1
- Few default values changed for Grid Code to allow easier commissioning.

ARFIF106V059

Replaced Application: ARFIF106V056

Used Firmware version: NXP4.90

System Software requirement: NXPV195

Released to field: 6.8.2018

Used in production:

Changes in new application:

- Added offset parameters for Grid Code monitored voltage.
 - Offset for Stop state
 - Offset for Run state
- High Frequency Power limit is not limited by given corner values.
 - Power limited linearly when frequency increases more than set value.

ARFIF106V056

Replaced Application: ARFIF106V055

Used Firmware version: NXP4.90

System Software requirement: NXPV195

Released to field:

Used in production:

Changes in new application:

- Anti-Islanding delayed 500 ms when started.

ARFIF106V055

Replaced Application: ARFIF106V048

Used Firmware version: NXP4.90

System Software requirement: NXPV195

Released to field:

Used in production:

Changes in new application:

- Minimum and maximum of individual main voltages are also monitored for Grid Code trip.
- F10 Line Synch fault disables when Grid Code functions are active.
- FRT active status to Line State B13
- Added 35 ms filtering to monitored frequency for Grid Code functionality.
- Power Follower hysteresis decreased to 3 %.
- Double Sampling active by default, disable CO2.B6.
- RegenCapSize compensation increase when negative power and negative CosPhi.
- F2 Over Voltage will open MCB immediately.
- Minimum reconnection time set to 1100 ms.
- Added Ramp function for power reference function.
- Ramp Down function for power when stop command is given.
- Power increase function added for low frequency.

ARFIF106V048

Replaced Application: ARFIF106V046

Used Firmware version: NXP4.90

System Software requirement: NXPV195

Released to field:

Used in production:

Changes in new application:

- Process Data handling moved to 10 ms time level from 20 ms time level.
- Grid Code stop request will open MCB
- Added 50 ms delay to MCB Open state when no feedback from MCB.
 - MCB opening was happening faster than stop command, resulted in F64 A4 fault.
- Added Active Start Command status to Status Word B11, B12 goes down if Grid Code functions request a stop.

ARFIF106V046

Replaced Application: ARFIF106V045

Used Firmware version: NXP4.90

System Software requirement: NXPV195

Released to field:

Used in production:

Changes in new application:

- The application now supports 16 fieldbus process data variables.
 - Settings for PD 9-16 are visible if a fieldbus board with support for 16 PD is inserted in option board slot D or E.
 - PD variables 9-16 can be enabled by setting an appropriate value for parameter P2.10.38 'Control Slot Selector'.

ARFIF106V045

Replaced Application: ARFIF106V043

Used Firmware version: NXP4.90

System Software requirement: NXPV195

Released to field:

Used in production:

Changes in new application:

- Voltage Low Limit Warning limit for stopping the drive is only possible in AFE mode. See Control Options 1 B11.

ARFIF106V043

Replaced Application: ARFIF106V039

Used Firmware version: NXP4.90

System Software requirement: NXPV195

Released to field:

Used in production:

Changes in new application:

- Power Ramp Rate is freezer during LVRT.
- Power Lock Low Voltage Reactive injection was stopping injection before reaching Lock Out Voltage Level, fixed.
- Power Lock High Voltage Reactive injection was stopping before reaching Lock Out Voltage Level, Fixed.
- Power reference will be 3 % smaller than a limit in case limiting, but not less than a zero.
- Added Lock Out Power parameter for High Voltage reactive injection for linear injection.
- FRT Enable has now selection
 - Disabled; Both curve and level will trip
 - Enabled; Voltage level will trip
 - Enabled; Curve will trip
 - Enabled; Neither will trip
- Added Control Options 2 B6; Double sampling
 - Reduces current measurement aliasing, needed e.g. in battery system when zero current reference needs to be accurate.
- Added Current Measurement offset identification.
- Possible to scale Capacitor Size based on Line Voltage.
- Power Follower hysteresis is also included in High Frequency Power limit trigger.
- Power limit that is given by Grid Code function block is no longer voltage compensated.

ARFIF106V039

Replaced Application: ARFIF106V030

Used Firmware version: NXP4.90

System Software requirement: NXPV195

Released to field:

Used in production:

Changes in new application:

- Grid Converter grid protections were active while Grid Code functions were used.
 - F70 Supply Voltage
 - F92 D7 Voltage
 - F91 Short Circuit
- If FRT function is used drive will use G2.17.9 Volt. Dip Time for stopping the modulation.
- Two Phase trip time was using three phase voltages for trip time calculation, fixed.
- Functions monitoring active current will see motoring active current as zero.
- Over Voltage reactive slope format was wrong, fixed #,# -> #,##
- Active Current Reference is limited by Active Current Limits to reduce over shoot in PI controller.
- Power Follower hysteresis increased from 2 % to 5 %.
- On reconnection Grid Converter limits has priority for 400 ms, fixed to follow Grid Code limit when Grid Code functionality is active.
- Certain specific setting was giving reactive current while Reactive Current Injection was not active, fixed.
- Added AFE Options 3 parameter
- Tripping to Frequency Change Rate was not making reconnection, fixed.
- Power PI Controller freeze during LVRT.

ARFIF106V030

Replaced Application: ARFIF106V029

Used Firmware version: NXP4.90

System Software requirement: NXPV195

Released to field:

Used in production:

Changes in new application:

- PI-Controller added for uGrid mode reactive reference.
 - Disabled when voltage controller or island mode is active.
 - User needs to disable reactive controller if true island but drive operating in uGrid mode.
- Added Output Power Limit as a monitoring value.

ARFIF106V029

Replaced Application: ARFIF106V028

Used Firmware version: NXP4.90

System Software requirement: NXPV195

Released to field:

Used in production:

Changes in new application:

- Symmetrical reactive injection parameter did not work, fixed.
- Added Grid Code Options parameter.
 - B01: Faster reactive injection, needed only to certain grid code standards.

ARFIF106V028

Replaced Application: ARFIF106V025

Used Firmware version: NXP4.90

System Software requirement: NXPV195

Released to field:

Used in production:

Changes in new application:

- Changes in DataLogger default signals.
- Added parameter to enable symmetrical current injection.
- Added power increase rate limiter function.
- Added High Voltage Power limit functions.

ARFIF106V025

Replaced Application: ARFIF106V021

Used Firmware version: NXP4.83

System Software requirement: NXPV194

Released to field:

Used in production:

Changes in new application:

- Connection to power unit is confirmed before checking license.
- Pulse MCB control was giving in power up opening command, fixed.
- Added function to start with Grid Voltage -> Zero Q start.
- Added function to keep zero reactive power -> Keep Zero Q

ARFIF106V021

Replaced Application: ARFIF106V019

Used Firmware version: NXP4.83

System Software requirement: NXPV194

Released to field:

Used in production:

Changes in new application:

- MCB close command was given before correct closing level was updated. Added function to verify that close level is correct.
- MotPot function for reactive current reference was running even if maximum limit was reached if DIN was active, fixed.
- Added parameter to limit Reactive Current reference given by MotPot function.
- MotPot function for Voltage reference was running even if maximum limit was reached if DIN was active, fixed.
- Possibility to bypass normal maximum DC-Link voltage reference level with Control Option B10.
 - This is only for momentary use, not to be used for continues reference.

ARFIF106V020

Replaced Application: ARFIF106V019

Used Firmware version: NXP4.83

System Software requirement: NXPV192

Released to field:

Used in production:

Changes in new application:

- Added Dynamic Support Kp parameter.
- Added Synch Kp parameter.
- Added Synch Ti parameter.
- Moved Active Current Kp and Ti parameters to different group
- Moved Synch Kp Start to different group
- Added DC Voltage Kp and Ti parameters.

ARFIF106V019

Replaced Application: ARFIF106V016

Used Firmware version: NXP4.83

System Software requirement: NXPV192

Released to field:

Used in production:

Changes in new application:

- Added inversion parameter for PI Power controller for AFE mode.
- Removed unsupported Master-Follower modes.

ARFIF106V016

Replaced Application: ARFIF106V015

Used Firmware version: NXP4.83

System Software requirement: NXPV192

Released to field: 14.2.2017

Used in production:

Changes in new application:

- Active current limit change to Power limit and function so that voltage changes are compensated
- Reset datalogger parameter was shown wrong in the monitor
- Added PI controller for power in AFE mode.

ARFIF106V015

Replaced Application: ARFIF106V

Used Firmware version: NXP4.83

System Software requirement: NXPV192

Released to field:

Used in production:

Changes in new application:

- Grid Code Fault Sub codes had offset, fixed.
 - A1 is Grid Code license fault sub code.

ARFIF106V006

Replaced Application: First Test Release

Used Firmware version: NXP4.83

System Software requirement: NXPV192

Released to field: 13.4.2016

Used in production:

Changes in new application:

- Only for testing purposes.
 - No manual, only parameter list.
 - Only for functionality comments purposes.