

InteliSys Gas

Gen-set controller for Gas application

SW version 2.4.0

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1 General information

1.1 Version information

This version adds several new functions.

1.2 Clarification of Notation

Note: This type of paragraph calls the reader's attention to a notice or related theme.

IMPORTANT: This type of paragraph highlights a procedure, adjustment etc., which can cause a damage or improper function of the equipment if not performed correctly and may not be clear at first sight.

WARNING: This type of paragraph highlights a procedure, adjustment etc., which can cause a damage or improper function of the equipment if not performed correctly and may not be clear at first sight.

Example: This type of paragraph contains information that is used to illustrate how a specific function works.

1.3 SNMP and WebServer support

Please, bear in mind, that WebServer and SNMP functions were removed from the IB-COM version 2.0 (and higher) and hence are not any more supported on that version. Details in the Note.

Note: The WebServer and SNMP functions were removed from the IB-COM version 2.0 (and higher) and hence are not any more supported on that IB-COM version. The IB-COM version 2.0 is uploaded to new ComAp controllers (types of controllers are listed below) since February 2022 and the IB-COM version on those new controllers cannot be changed to an older one. This means, that the new controllers (listed below) do not support the WebServer and SNMP functionality.

List of controllers no longer supporting SNMP:

- > IntelliGen NTC BaseBox
- > IntelliSys NTC BaseBox
- > IntelliMains NTC BaseBox
- > IntelliSys GAS
- > IntelliGen GSC-C
- > IntelliSys GSC-C

List of controllers no longer supporting WebServer:

- > IntelliGen NTC BaseBox
- > IntelliSys NTC BaseBox
- > IntelliMains NTC BaseBox

Please note that in this list there is no IntelliSys GAS, IntelliGen GSC-C, IntelliSys GSC-C, since they didn't have WebServer in the first place

2 Changes in the version 2.4.0

2.1 Repairs

- Sd ECU

- Sd ECU has occurred even if the SD protection was not configured on ECU module.

3 Changes in the version 2.3.0

3.1 New features

- New support of Denox20 / Denox2.
- New support of IBF-INCON.
- Values *LS Gain* and *LS Int* are now force-able.
- Added an option to select Run Hours source.
 - » Works for both cases if read from ECU or counted in internal counter.
- Changed the setpoint *ECU Diag*. Add new option ENAB-TOUT-ONLY.
 - » DISABLED: no change
 - » ENABLED: no change
 - » ENAB-TOUT-ONLY: ECU alarms are deactivated only when their timeout expires. Not when empty message (with zero data) comes.

3.2 Repairs

- PID regulator output jumping.
 - » There was a "jumping" of PID regulator output when driving values are changed during operation.
 - » Fixed.
- *ActPwrReq* could be higher than *InstalledPower* in parallel to mains operation.
- Fixed communication errors occurring on CAN1 between IH-NT and IFG.
- In multiple island, when Local Baseload is deactivated, it causes the *Act Pwr Req* to jump/peak instead of ramping.
 - » Fixed – *Act Pwr Req* should ramp after deactivation of local baseload (the same way as when the *Local Baseload* is activated).

3.3 Others

- In this SW version there was reduced the total number of supported I-AIN8 or I-AIN8TC modules to 14 from previous 15.

4 Changes in the version 2.2.0

4.1 New features

- New default value for the setpoint **MCB close del** = 5,0 s
- SiteSim archives were updated
- New alarm **WrnInvalidPrio** - active if setpoint **Priority** > 32

4.2 Repairs

- Fixes in communication between ECU and controller
- LBO **GenParams OK** behavior with blocked BOC protection was fixed
- Exceeding of the value **ActPwrReq** over the setpoint **InstalledPower** when returning from Power Derating was fixed

5 Changes in the version 2.1.0

5.1 New features

- Added support for Waukesha ESM2 ECU. The ECU was added to ECU list -Standard 8.1.1. We highly recommend using the latest ECU list. For more information please refer to Electronic Engines Support Guide.
- Updated context help file - communication objects related to:
 - Dynamic spinning reserves function
 - Power reduction
 - CAN bus communication mode

6 Changes in the version 2.0.0

6.1 New features

- MINT application is newly compatible with IntelliNeo controllers
 - Support of Dynamic Spinning Reserves function
 - New setpoint available: **Dynam Spin Res**
 - New values available: **DynSpinRes**, **DynSpinResOffs**
 - New LAIs available: **DynSpinResReq**, **DynSpinResOfst**
 - IntelliNeo controllers are recognized on CAN bus
 - Prioritization rules for voltage regulation in Island operation
 - Updated evaluation of **Load Reserve**

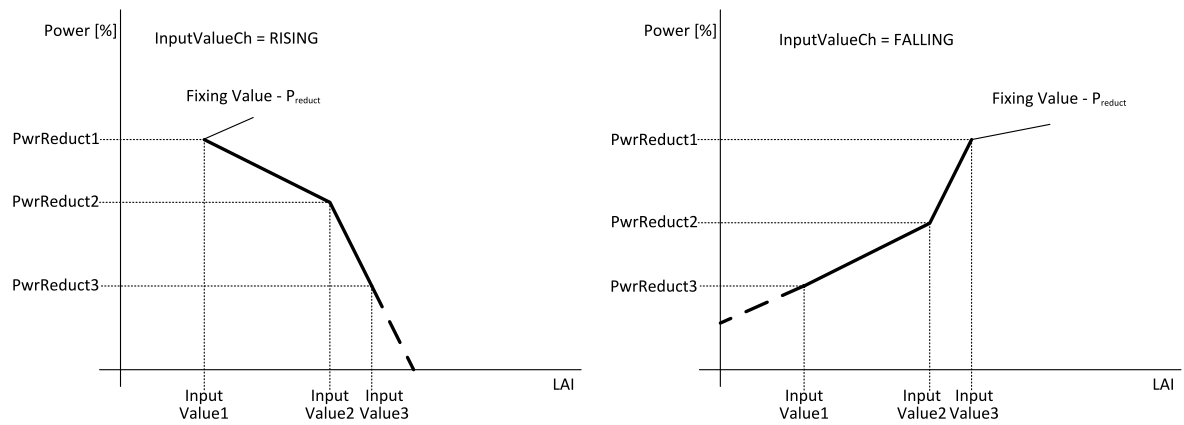
IMPORTANT: Please be informed that IS2GAS firmware 2.0.0 supports the IntelliNeo controllers (Dynamic Spinning reserve) which impacts Power Management functionality. Because of this, all controllers on CAN 2 have to have the Power Management updated. We highly recommend using these FWs (or higher): IGS-NT 5.0.0, IM-NT 4.0.0, IGS-GSC 2.0.0, IM-GSC 2.0.0, and IS2GAS 2.0.0.

- SW dongle functionality and setpoint were removed
- Power Reduction update - possibility to define whether to base the Power Reduction calculation on Active power (as up till now) or Installed power
 - New setpoints: **PwrReductBaseA**, **PwrReductBaseB**, **PwrReductBaseC**
 - New LBOs: **PwrReductFulfA**, **PwrReductFulfB**, **PwrReductFulfC**
 - Renamed LBOs: *PwrReductA* to **PwrReductActA**, *PwrReductB* to **PwrReductActB**, *PwrReductC* to **PwrReductActC**
- New kinds (Kind59, Kind60) were added to Standard J1939 engine for E2KnockCon support
- 16C (125 kbps) CAN communication mode was added
 - Setpoint **CAN bus mode** now has three options - 8C/16C/32C

6.2 Repairs

- Fixed wrong calculation of Load Reserve, when a Gen-set in PMS is switched to MAN mode
- Power Reduction
 - Extrapolation of power reduction curve now works correctly

- » FALLING power reduction now works according to specification - value **P Reduct A**(or B or C) decreases with decreasing LAI **PwrReductionA** (or B or C):



- » Fixed synchronisation of setpoint **#SummerTimeMod** on intercontroller CAN

7 Changes in the version 1.10.0

7.1 New features

- High limit of the setpoint **CrnkFail pause** was changed to 240 s
- Alarm type of the timer **ServiceTimeSd** was changed to **Slow Stop**
 - Setpoint **ServiceTimeSd** was renamed to **ServiceTimeStp**
 - Value **ServiceTimeSd** was renamed to **ServiceTimeStp**
 - Alarm **Sd ServiceTime** was renamed to **StpServiceTime**
 - History record **Sd ServiceTime** was renamed to **StpServiceTime**
- Setpoint **InstalPower** was renamed to **InstalledPower**
- Support of reading 32 bit values from TPEM Modbus ECU was added
- Support of dongles **IGS-NT-AFR-PCM** and **IGS-NT-AFR-LSM+PMS** was added
- New SW Dongle functionality was added as a backup to physical dongles due to possible lack of components
 - This functionality was added, but was not activated
 - New setpoint **SW Dongle**
 - New value **SW Dongles**
- New SW Key functionality was added
 - Unlocks additional and paid functions: Dynamic Spinning Reserve (available in 1.11.0)
 - New setpoint **SW Key**
 - New value **SW Keys**
- New values for CAN1 communication diagnostics
 - **CANBusOffCount**: Counter of Bus Off states
 - **CANErrCountRx**: Receive Error Counter
 - **CANErrCountTx**: Transmit Error Counter
- Support of more analog outputs for extension modules **Inteli IO8/8** and **Inteli IO16/0**
 - In previous versions, analog outputs were only available for module addresses 1, 2, 3, 4. In total, 8 outputs were supported (2 per each address).
 - Now analog outputs are also available for module addresses 5, 6, 7, 8. In total, 16 outputs are currently supported.
 - The extension modules must have version 1.3.0 or newer to support these additional outputs
- Resolution of these setpoints was changed to 0.1
 - Min power PtM
 - Derating1 pwr
 - Derating2 pwr
 - PwrReduction1A / PwrReduction2A / PwrReduction3A
 - PwrReduction1B / PwrReduction2B / PwrReduction3B
 - PwrReduction1C / PwrReduction2C / PwrReduction3C

8 Changes in the version 1.9.1

8.1 New features

- Support of Counter and Checksum values was added for ECU messages. Number of these values is not limited.

8.2 Repairs

- Modbus ECU communication was modified to prevent communication loss in case of invalid output signal.

9 Changes in the version 1.9.0

9.1 New features

9.1.1 New applications for support of gen-sets with asynchronous generator

- There are two new default archives (applications) in IntelliSys Gas supporting control of gen-sets with asynchronous generator:
 - IS2GASXX-ASYNC-SPI-x.x.x.x.ant
 - IS2GASXX-ASYNC-MINT-x.x.x.x.ant
- Only the Parallel to Mains Operation is supported
 - The setpoints **Island enable**, **ParallelEnable** and **Synchro enable** have been removed. They are internally set like this:
 - Island enable = NO
 - ParallelEnable = YES
 - Synchro enable = FORWARD
 - Async-SPI
 - When there is not healthy voltage on the Mains or the MCB is open, the alarm **OfL GCBCloseBlock** is active
 - Async-MINT
 - When the MCB is open, the alarm **OfL GCBCloseBlock** is active
- There are two types of engine start: Starter with RPM matching and Start over GCB
 - Starter with RPM matching
 - Setpoint **Engine Start = Starter**
 - Standard start sequence with activation of **LBO: Starter** is performed
 - GCB can be closed via RPM matching
 - Start over GCB
 - Setpoint **Engine Start = Close GCB**
 - The **LBO: Starter** is not activated
 - When any Off Load alarm is active, this type of start is not allowed
 - Manual opening / closing of the GCB is blocked during the start sequence
 - When the engine speed reaches **Y/D RPM**, the **LBO: Y/D** is closed, the Engine state is switched into Soft load and controller starts to regulate power.
- Regulations
 - Voltage and PF/Q
 - Asynchronous generator is not able to regulate voltage or PF/Q
 - All regulations of these values are removed, including VAr sharing
 - All related setpoints and values are also removed

- » Speed regulation
 - Engine speed is regulated to the value:
 - **SynchroSpeed**, when RPM matching is active
 - **Nominal RPM**, when RPM matching is not active
 - The regulation is active when the GCB is open and:
 - RPM reg loop = ALL THE TIME, or
 - RPM reg loop = RPM MATCH ONLY and RPM matching is active
 - Regulation constants
 - Gain factor **RPM gain**
 - Integration factor **RPM int**
- > Measurements
 - » The engine RPM is never calculated from the generator frequency
 - » The range of the setpoint **Gear teeth** is changed to 1 .. 500
 - » There is no option FGen → RPM
- > Protections and alarms
 - » Alarm Pickup fail
 - This alarm is not activated when the engine speed doesn't correspond to the generator frequency
 - It is still activated when the engine is considered to be running but there are no RPM
 - » Generator protections
 - The generator protections are enabled with delay adjusted by the setpoint **GenerProt del**
 - This delay starts to be counted when the GCB is closed
 - The generator protections are disabled when the GCB is opened
 - » Reverse power
 - When the **LB1: ReversePwrBlick** is active, this protection is disabled
 - » Excitation Loss
 - Asynchronous generator has no excitation
 - This protection is removed
 - » OfL GCBCloseBlock
 - This alarm blocks closing of the GCB to prevent Island Operation
 - It is activated when the MCB is open or when there is not healthy voltage on the Mains
 - It is not possible to override this protection by the **LB1: Sd override**
 - » Stp RPM match fail
 - This alarm is activated when RPM matching is not successful
 - It is analogy to the alarm Stp Sync fail in standard applications

9.1.2 Other new features

- > Resolution of all four setpoints LoadReduct1-4 was changed to 0.1 %
- > Force value for the setpoint MATcorrection (group AFR Control) is allowed.

- A description text of commands is added to the xml prescription.
- During Warming time will be activated soft unload and GCB open level will be accepted (like in other Gen-set sequences).
- Modbus registers were offset.
- New LAI: LOCAL BASELOAD

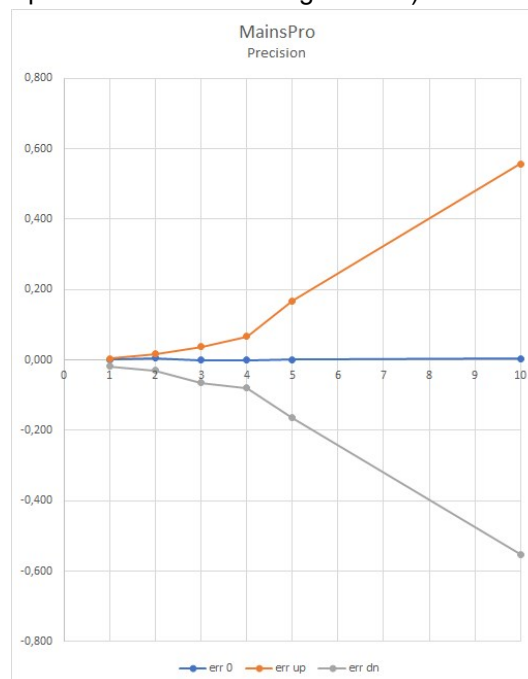
Local Baseload

Related FW	2.4.0	Related applications	MINT, Combi
Range [units]	OFF, 1 .. Nomin power (page 1) [kW]		
Resolution	1		
Comm object	405		
Description			
<p>This functional input is used to adjust setpoint <i>LocalBaseload</i> from 0 to 100 %.</p> <p>Force value must work as before, if someone uses both Force value and LAI, force value will have higher priority than LAI.</p> <p>No more condition like additional LBI to activate this LAI is not required.</p> <p>When the setpoint <i>LocalBaseload</i> is not in OFF then the Gen-set must be still counted in power management system.</p> <p>When the LAI: LOCAL BASELOAD will be configured, then will be available to change setpoint: <i>LocalBaseload</i> from OFF to Nomin power.</p>			

9.2 Repairs and fixed bugs

- History might get overwritten by records "LB connected" / "LB disconnected".
- ActPwr did not change with *ReqCurrByPwr* in MultisIOPr.
- Engine speed regulation does not work with Cummins CM850. Incorrect conversion of the Speed Request were done.
 - Correct speed request conversion is done.
- Ana protection – invalid value of value corrected.
- Common analog (configurable) fast protection evaluation.
 - The fast protection is evaluated in 100 ms loop.
- SMS-GSM did not work via IB-NT – RS232 on FW 3.2.0 and higher.
- SMS did not work if IB-NT is connected via RS232 instead of CAN2.
- Baudrate of intercontroller communication CAN2 by setting CAN bus mode -8C is corrected to 62.5 kbit/s.
- Min Power PTM is usually the lowest limit of power parallel to mains.
- Gen-set stayed loaded no matter what buttons were pushed before transition from the AUT mode to the SEM mode was done.
- One exception and this is Warming procedure, while the Warming procedure is active the Min Power PTM should be ignored – but here is the Min Power PTM limitation active also in Warming.
- Counters of LBI Load Reduct 1-4 were counted only in parallel mode.
- PF/Q regulation freezing was activated with delay
- There are accumulative statistic values for Load Reduct 1-4 functions and they should be incremented continuously from the beginning or from the last "set statistic".
 - But this values were incremented only after each month.

- *ReqEngineSpeed* is now updated.
- Values of signal Fuel Rate defined as ECU value with SPN183, were incorrectly converted to US format from EU format.
- Premature PLC Delay output deactivation corrected according the diagram in the Global Guide
- Corrected issue while *SynchoEnable* = 0 in MINT application that caused the OperConflict
- Standard J1939 ECU modules is working and CU goes after programming to operational mode.
- ECU J1939 does support the UNSIGNED8 sending type
- The conditions of activation of PT1 filter are corrected. PT1 filter can be active only:
 - If the setpoint $P(U_m)$ is set to $P_{nom}(U_m)$ or $P_{act}(U_m)$ and P Ramp Filter is set to Enabled and the P (U_m) event is active (means it is the most reducing algorithm with highest priority)
- Alarms for missing curves PWROVRFREQ and PWRUNDRFREQ are not evaluated in MINT.
- Value $P(U_m)Curve$ shows the correct value instead of 100 times smaller values (for example -0.30 % instead of -30.00 %)
- The controller counts "Run hrs" also in Emergency MAN mode when engine is considered as not stopped. Engine is not stopped when one of these conditions is fulfilled:
 - RPM is detected
 - Oil pressure is higher than Starting Oil Pressure
 - D+ voltage detected
- Default value of the setpoint *PwrOvUnFreq* is DISABLED
- COX application has been removed
- It is possible to write analog values to the ECU via Modbus due to ECU communication support of new Altronic NGI-1000RC.
- New kinds 44 – 49 for support digital AVR L-S
- RoCoF precision was degraded for higher signal values. Signal evaluation has better precision over the declared measuring range (example is shown on the image bellow)



- The RoCoF evaluates without spikes and signal evaluation has good precision over the declared measuring range.

- Wrong character in Sensor types.
 - There is no **Â** character in the sensor type names.
- PostVRT cannot be active when LVRT or OVRT is active for more than 65 seconds.
- Incorrect impulse counting of Inteli AIN8 on Impulse input corrected
- Setpoint *Pave* is changed with power format
 - Previously *Pave* function did not match with power format 0.1 kW
- When the Samax setpoint is set to OFF (**MINT archive**), the alarm *Samax<NominPow* is not shown.
- Export limit ENABLE did not limit the export in case of used mode LoadCtrlPTM = T By Pwr
 - The load control is controlled by the requested value *TempByPwr Req* but the load must be limited by the value Import load in case the Export limit is enabled. If not, the power is limited only by *InstalledPower*
- PLC Counter – counting block failure
 - There is no internal counter level change when INPUT CLR. is deactivated.
- The Power values kW, kVAr, kVA did overflow when the measured generator power went over the 3276.7 kX in 0.1 kX power format or 32767 kX in powerformat 1 kX.
- Transmitted constant in ECU J1939 were serviced wrongly
- The synchronization diagram on IV5/IV8 did not show correct *VoltMatch* (it was still showing 000).
- Default screens appeared like user screens
 - All screens in default archives appear like default screens
- PforQ function is able to reach $\pm 33\%$ *Samax* on *React power by Reduction P* and *Regulation Q* in this function.
- The AFR screens are in default configuration only when the AFR module is configured.
- Wrong evaluation of ECU module protection.
 - Even the protection was set to WARNING or NO PROTECT the controller tripped the "SD ECU" alarm if the ECU was not connected.
- Looping of *ActiveEmail Sending/Fail* corrected
- Power Over- Under- Frequency behavior corrected
- Commands now do work with password through AirGate and Ethernet
 - Data in CO 24550 are shifted and incremented ($> 16 + 1$) after command is executed
- PQ-L curve was not activated in some area.
 - LBO is not triggered correctly
- IV12 was missing assignment for *Power Meter* and synchroscop on home screen
- Premortem history records were done even when engine is stopped.
- The value *SystPF/QCtrl* did not show correct Q control mode.
- Load shedding activating with MCB off
 - When *Load Shedding* mode is ISL+TRIP+PARAL, Mains is down, so all Load Shedding levels are activated together with MCB OFF coil at same time.
 - During unsuccessful MCB closing, MCB OFF coil has no influence on Load Sheeding outputs.

10 Changes in the version 1.8.0

10.1 New features

- Change of the functionality Local Baseload was implemented
 - The Actual power of the Gen-sets running in local baseload will not be subtracted from the system load reserve. It should allow to operate the one or more banks in local baseload and part of Gen-set in power management.
- Slow Stop protection upgrade
 - Gen-set with active slow stop protection was in previous FW versions completely unloaded, when system load enabled that. This was changed and Gen-set is not completely unloaded when the Slow stop protection is active. Its output (active power request) can be reduced only to 20 % of its nominal rating to avoid possible reverse power issue.
 - Reduction to 20 % is done only when it is possible, Gen-set with active Slow Stop protection does not overload the other running Gen-sets.
 - Load control of the Gen-set with active Slow Stop protection depends on the setpoint SlowStopLoad. Behavior described in the previous paragraphs applies when SlowStopLoad = UNLOAD.
 - New setpoint SlowStopLoad

SlowStopLoad

Setpoint group	Pwr management	Related FW	1.8.0
Range [units]	UNLOAD / LDSHARING [-]		
Default value	UNLOAD	Force value	YES
Step	-		
Comm object	16648	Related applications	MINT, Combi
Description			
This setpoint defines behavior of a Gen-set with active Slow stop protection:			
UNLOAD – Gen-set is unloaded as much as possible (other Gen-sets are not overloaded). The unloading is limited to 20% of its Nomin power rating to avoid reverse power issue. Gen-set load can be lower than 20%, if system load is low and all Gen-sets are forced to operate with such a low load level.			
LDSHARING – Gen-set is not unloaded, load sharing with other Gen-sets is done until a backup Gen-set is started and loaded.			

- Force value was allowed for setpoints related to control groups
 - Control group
 - GroupLinkLeft
 - GroupLinkRight
- Grid Codes curves were added into the FW package
 - These curves can be easily imported in GenConfig
 - They can be used when default curves were modified and you want to go back to default curves

10.2 Repairs

- Non functional Slow Stop protection in relative power management has been fixed
 - Calculation of Active reserves has been changed
- Problem with communication errors of DISTBIN virtual module has been fixed
- CAN communication interface has been modified to prevent communication error on the CAN2 bus
- Modbus registers for default protections were not generated
 - This bug has been fixed
 - The complete list of Modbus registers is available in GenConfig version 3.13.0 or newer
 - File -> Generate Cfg Image -> Generate Cfg Image (Modbus Registers - all)
- Non functional ROCOF protections in the SPI application were fixed

11 Changes in the version 1.7.1

11.1 New features

- The possibility to read the alarms from ECU MTU MIP 4000 via Modbus was added

12 Changes in the version 1.7.0

12.1 New features

- Generator frequency protections update
 - Range of the generator overfrequency protection (Gen >f) has been extended to 0.00 Hz ... 10.00 Hz
 - Range of the generator underfrequency protection (Gen <f) has been extended to -10.00 Hz ... 0.00 Hz
- Mains frequency protections update
 - Second level of the Mains underfrequency protection was added (Mains <<f MP) with range -10.00 Hz ... 0.00 Hz
 - Range of the Mains underfrequency protection (Mains <f MP) has been extended to -10.00 Hz ... 0.00 Hz
 - Range of the Mains underfrequency protection delay (Mains <f Del) has been extended to 0.00 s ... 1000.00 s
 - Ranges of the Mains overfrequency protections (Mains >f MP and Mains >>f MP) have been extended to 0.00 Hz ... 10.00 Hz
 - Ranges of the Mains overfrequency protections delays (Mains >f Del and Mains >>f Del) have been extended to 0.00 s ... 1000.00 s
- Control of active power based on over/under frequency – update
 - New setpoint PwrOvUnFreq which enables/disables the function
- Changes in connection conditions and synchronization
 - New setpoint MainsSyncDel – when voltage and frequency are in limits (MainsSyncVMax, MainsSyncVMin, MainsSyncFMax, MainsSyncFMin), start is allowed after the time MainsSyncDel (in the AUT and SEM mode). In the MAN mode, synchronization is allowed after this time.
 - The voltage and frequency requirements for synchronization (MainsSyncVMax, MainsSyncVMin, MainsSyncFMax, MainsSyncFMin, MainsSyncDel) are taken into account only if synchronization to the mains is ENABLED.
 - The setpoint MP SyncTLong has been renamed to MP SyncDel.
 - The voltage and frequency requirements for synchronization after mains fail (MP SyncVMax, MP SyncVMin, MP SyncFMax, MP SyncFMin, MP SyncDel) are taken into account only if synchronization to the mains is ENABLED.
 - The alarm SyncNotAllowed and the history record are shown only if synchronization to the mains is ENABLED.
- Event management update (ramps)
 - Setpoints which select the ramp for events (e.g. MainsFrqRise, MainsFrqFall, LoadReduct etc.) are now set to times independently for each event. Previously one of three ramps had to be selected (Slow load ramp, Load ramp, Fast load ramp).
 - Range of these ramps is 0 s ... 600 s
 - The setpoints Slow load ramp and Fast load ramp have been removed.
 - The setpoint Load ramp is now not used by events, but it is still used for standard loading of power.

- Average voltages and modification of MainsAv10>V MP protection
 - New values for 10-minutes moving average of phase-neutral mains voltages (MainsV10L1-N, MainsV10L2-N, MainsV10L3-N) have been added.
 - These values are calculated only when FixVoltProtSel is PHASE-NEUTRAL or BOTH + PH-N. The MainsAv10>V MP protection is in that case evaluated from phase-neutral average voltages.
 - The values for 10-minutes moving average of phase-phase mains voltages (MainsV10L1-L2, MainsV10L2-L3, MainsV10L3-L1) are calculated only when FixVoltProtSel is PHASE-PHASE or BOTH + PH-PH. The MainsAv10>V MP protection is in that case evaluated from phase-phase average voltages.
- Grid Codes user curves protection against removal and change of resolution
 - When the resolution of a Grid Codes curve is changed or a Grid Codes curve is removed, this situation is indicated by warning.
 - Names of the warnings are: Wrn PwrOvrFreqFail, Wrn PwrUndFreqFail, Wrn 3pLVRTCrvFail, Wrn 2pLVRTCrvFail, Wrn 1pLVRTCrvFail, Wrn OVRTCrvFail, Wrn CapabQLCrvFail, Wrn CapabQCCrvFail, Wrn UQcurveFail, Wrn PQcurveFail, Wrn PF(Pm)Fail, Wrn Q(Um)Fail, Wrn QrUlimFail, Wrn Q(P)Fail, Wrn PaveFail, Wrn P(Um)Fail.
 - The warnings appear only when the function related to the curve is enabled. For example, Wrn PwrOvrFreqFail and Wrn PwrUndFreqFail appear only when the setpoint PwrOvUnFreq = ENABLE.
 - The warnings related to dynamic support function (Wrn 3pLVRTCrvFail, Wrn 2pLVRTCrvFail, Wrn 1pLVRTCrvFail, Wrn OVRTCrvFail) don't appear when the curves are removed. These curves have adjustable resolution from 0.01 to 1.
- $P_{AV,E}$ monitoring function was added
 - Protection against exceeding maximum exported power agreed with the grid
 - Setpoint Pave defines the limit for power export
 - Setpoint Pave CBsel selects the breaker to be opened (SPtM only)
 - Value Pmom/Pave gives the ratio between Pmom and Pave. Sign of this value is inverted because of ComAp import/export sign convention.
 - LAI: Pmom – imported power, usually measured by IntelliPro SYNC
 - LBO: Pave – indication, that export limit set by the curve Pmom/Pave Max was exceeded. It is active for 5 seconds.
 - LBO: Pave FLS – indication, that LAI: Pmom is not configured or the value is invalid
 - Alarm: Pave – activated after GCB or MCB was opened by this protection
 - Curve: Pmom/Pave Max - Pmom/Pave (y axis) and time to open the breaker (x axis)
- Dynamic network support - update
 - Activation of the LVRT function is indicated by a new LBO: LVRT Active.
 - Activation of the OVRT function is indicated by a new LBO: OVRT Active.
 - Voltages for evaluation by the function are selected by the setpoint FixVoltProtSel (phase-neutral, phase-phase or both).
 - The type of alarm issued by this function (VRT Trip) can be selected by the setpoint DynSupProtType (NO PROTECTION / HIST RECORD / WARNING / MAINSPROTECT).
 - PF/Q regulation loop can be deactivated when LVRT or OVRT is active by switching the setpoint DynSupPF/Qctrl to the position STOPPED.

- » New LBO: LVRTCureTrip was added. The output closes when the voltage drops below the line of LVRT curve and opens when it goes back.
- » New LBO: OVRTCureTrip was added. The output closes when the voltage goes above the line of OVRT curve and opens when it goes back.
- » The LBO: VRT Prot Trip was removed because it was replaced by the LBOs: LVRTCureTrip and OVRTCureTrip.
- > Active power reduction based on the actual mains voltage $P(U_m)$
 - » The active power reduction is based on the curve $P(U_m)$.
 - » New setpoint $P(U_m)$ (group Grid Codes) to enable/disable the function and to set mode of the function.
 - » When $P(U_m) = P_{nom}(U_m)$, the reduction is based on the setpoint InstalledPower, the value P_m is not saved.
 - » When $P(U_m) = P_{act}(U_m)$, the reduction is based on the actual power, the value P_m is saved.
 - » New setpoint $P(U_m)$ (group ActPwrRamps) which sets the ramp of this event.
 - » New setpoint $P(U_m)Pr$ (group ActPwrRamps) which sets the priority of this event.
 - » New LBO $P(U_m)$ which is active when power is reduced by this event.
 - » New setpoint P Ramp Filter selects whether the active power ramp is linear (DISABLE) or PT1 Filter ramp (ENABLE).
- > Calculation of moving average values was improved for better accuracy
 - » Generator power values: ActPwr10minAvg, RctPwr10minAvg, AppPwr10minAvg
 - » 10-minutes average of mains U (Ph-Ph): MainsV10L1-L2, MainsV10L2-L3, MainsV10L3-L1
 - » 1-minute average of mains U (Ph-Ph): MainsV1L1-L2, MainsV1L2-L3, MainsV1L3-L1
- > New Grid Codes screens and modification of Main screens for:
 - » InteliVision 5
 - » InteliVision 8
 - » InteliVision 12Touch

12.2 Repairs

- > Value ActPowerReq was incorrect in ANEXT BASELOAD mode when setpoint PforQlimit = ENABLED
 - » Now this value is correct all the time
- > Setpoint Baseload was incorrectly limited by Nomin power
 - » Now it is limited by InstalledPower
- > Evaluation of the value Volt match 123 on synchronization diagram was fixed
- > Value ReqEngineSpeed has been fixed to show correct value
- > Missing curves were added to Combi archive

13 Changes in the version 1.6.0

13.1 New features

13.1.1 MINT archive with VDE 4110 functions

- Detailed description of grid codes can be found in [InteliSys Gas 1.6.0 Global Guide.pdf](#)
- MINT application works only in cooperation with Mains controller because MINT application does not contain any mains measurements
- To keep proper function with mains controller the control mode with mains controller must be set to LoadSharing and VArSharing type
- Shared parameters
 - Setpoint #SysBaseQ is a new shared setpoint
 - #SysPwrFactor function is modified in case of setting of #SysPFctrlPTM = VSHARING but this change of behavior has influence only on the mains controller
 - Setpoint #SysPFctrl PtM switches newly VSHARING/BASEPF/BASEQ
 - #SysBaseQ is active only in case the #SysPFctrl PTM is switched to VSHARING (but in this case must be Q control mode active on IM) or BASEQ
 - #SysPwrFactor is active only in case the #SysPFctrl PTM is switched to VSHARING (but in this case must be PF control mode active on IM) or BASEPF
- #SysBaseQ can be controlled externally by analog input
 - When the Setpoint #SysPFctrl PtM is switched to BASEQ mode and setpoint SysBasePFQMode (this setpoint was originally named SysBasePFMode) is switched to EXTERNAL, the reactive power of the whole system (SysBaseQ) can be controlled by analog input: LAI MQ:AnExSysBQ
 - In this case the Setpoint #SysBaseQ is inactive
- Setpoint Samax
 - Samax is the maximal apparent power of the generator
 - Range of the setpoint is 0 (OFF) ... 32000 (unit depends on the selected power format)
 - In case Samax is >0, it is taken as reference for apparent power in kVA power management and the Inom will be calculated for power management from Samax and Unom
 - In case Samax is OFF, the apparent power for kVA power management is calculated as usually from Unom and Inom
- Setpoint InstalledPower
 - This setpoint defines the maximal installed power of Gen-set, this is actually the power which the Gen-set is able to run in parallel to mains
 - Range of the setpoint is 0 (OFF) ... Nominal power, default value is OFF
 - The value of InstalledPower is internally connected with Derated power
- Function Post VRT
 - Function VRT is fully evaluated in Mains controller
 - The function Post VRT which has to react on situation after VRT is evaluated in cooperation with Gen-set controller with the LBI: RegCurrByPwr

- » When the LBI is active, controller decreases the LocalBaseload in case the Gen-set current is higher than the nominal current
- » Local BasePF and Local BaseQ
 - » These functions regulate the required PF / required Q independently on the #SysPwrFactor / #SysBaseQ requirement
 - » These functions are available only in multiple parallel operation, that means they are evaluated only in case the LBI: MCBfeedback is active
 - » In case both Local BasePF and Local BaseQ are active (they are set to nonzero value), the Local BasePF has higher priority
- » Capability of PF and Q
 - » All PF and Q requirements are calculated according the PQ capability of the generator including the functions Local BasePF and Local BaseQ
 - » This limitation is set by the CapabilityQ L and CapabilityQ C user curves
- » New values
 - » Required Q - the required value which has to be reached by Volt/PF regulation loop
 - » Required Qrel - the required relative value which has to be reached by Volt/PF regulation loop
 - » Required PF3dc - the required power factor which has to be reached by Volt/PF regulation loop
 - » Required PF ch - the required power factor characteristic (L,C,R) which has to be reached by Volt/PF regulation loop
 - » All these values can be limited by the PQ capability of the generator

13.1.2 Setpoints and LBOs related to Events are renamed

- » Setpoints for Event types

Old name	New name
RampEvtType1	MainsFrqRise
RampEvtType2	MainsFrqFall
RampEvtType3	LoadReduct
RampEvtType4	MainsTripPer
RampEvtType5	PforQ
RampEvtType6	SoftUnload
RampEvtType7	PwrReductA
RampEvtType8	PwrReductB
RampEvtType9	PwrReductC
RampEvtType10	PostVRT
RampEvtType11	RetOvUnFreq

- » LBOs for Event types

Old name	New name
Event1	MainsFrqRise
Event2	MainsFrqFall

Event3	LoadReduct
Event4	MainsTripPer
Event5	PforQ
Event6	SoftUnload
Event7	PwrReductA
Event8	PwrReductB
Event9	PwrReductC
Event10	PostVRT
Event11	RetOvUnFreq

➤ Setpoints for priorities of Events

Old name	New name
RampEvntPrio1	MainsFrqRisePr
RampEvntPrio2	MainsFrqFallPr
RampEvntPrio3	LoadReductPr
RampEvntPrio4	MainsTripPerPr
RampEvntPrio5	PforQPr
RampEvntPrio6	SoftUnloadPr
RampEvntPrio7	PwrReductAPr
RampEvntPrio8	PwrReductBPr
RampEvntPrio9	PwrReductCPr
RampEvntPrio10	PostVRTPr
RampEvntPrio11	RetOvUnFreqPr

13.1.3 Other new features

- Default credentials handling is changed
 - Controller always issues warning alarm *Wrn DefCredentials*, if administrator password and/or access code is set to "0"
 - The red alarm *Sd DefCredentials* is removed
- The setpoint Samax has been moved into the Basic Settings group below the setpoint InstalledPower
- Second firmware package IS2GASXX_FW-1.6.0.16.igc is created
 - This package contains only FW specific files
- Number of External Values is increased to 12
- LBO CtrlHeartBeatF is removed from configuration because it is no more needed

13.2 Repairs

- Frequency drop caused by Slow Stop protection is fixed
 - This problem was present in multiple Island Operation
 - When Slow Stop protection is now activated at one Gen-set, it stops to perform load sharing with the rest of the system. Unloading is performed, but it is limited, so the rest of the system is not overloaded.

- Q Ramp reached requested value only on average 90%
 - Now it is fixed to 95%
- Hysteresis of mains protections for Ph-Ph was incorrectly calculated from Ph-N voltage
 - Now it is correctly calculated from Ph-Ph voltage
- Force value function was not available for MainsSync and MP Sync
 - Setpoints MainsSyncVMax, MainsSyncVMin, MainsSyncFMax, MainsSyncFMin, MP SyncVMax, MP SyncVMin, MP SyncFMax, MP SyncFMin and MP SyncTLong can now be forced.

14 Changes in the version 1.5.0

14.1 New features

14.1.1 Support of Grid codes VDE 4110

- Detailed description is in IntelliSys Gas 1.5.0 Global Guide.pdf or in GridCodes Guide IntelliSys Gas 1.5.0.pdf
- Here is list of main features for VDE 4110
 - Accuracy of frequency measurement – visualisation of fmains with 3decimals
 - Moving average values – ActPwr, ReactPwr, ApparPwr, Umains
 - Network safety management – power reduction through LBI
 - Mains frequency gradient (ROCOF)
 - New regulation modes of Q/PF
 - Modified function of reduction P to gain Q
 - Modified function of Dynamic support (LVRT, OVRT)
 - Modified function of Control of active power based on the over/underfrequency
 - New mains protection fm>>
 - Modified function of Q&U protection
 - Modified function for connection and synchronization to the mains

14.1.2 Other new features

- Increased number of possible configurable user sensors from 16 to 32 curves
- Optimization of processor load
- History system log optimization
 - System log which was previously written every across over the limit value is now in default written only once a day
- Implemented check of FW and HW compatibility with new product IS2GSC
- Default credential handling
 - Controller always issues warning alarm Wrn DefCredentials, if administrator password and/or access code is set to "0"
 - Controller issues shutdown alarm Sd DefCredentials, if administrator password and/or access code is set to "0" AND engine is not running
- AFR regulation is changed
 - The regulation loop is changed in sense of the sign of the AFRvalve gain setpoint
 - When upgrading from older firmware version to the version 1.5.0 or newer, it is necessary to change the sign of the AFRvalve gain setpoint for proper regulation

14.2 Repairs

- LBO: MainsProtState was not activated with fast protection
- Derated value under MinPowerPTM causes overload of engine
 - Following setpoints are now interlocked with MinPowerPTM to prevent the setting under MinPowerPTM
 - Derating 1 pwr
 - Derating 2 pwr
 - PwrReduction1A
 - PwrReduction1B
 - PwrReduction1C
 - KnockingReduct
- Bus freq fail in MINT application is fixed
- Pickup fail wrong evaluation when Gear teeth is 0
- Wrong DxLoadReduct evaluation in low power
- Fixed of issue with programming of controller
- Force value for AFR functionality related setpoint LimPos is fixed
- Object PF and LChr weren't filled correctly in parallel operation
- Modbus ECU alarm was not initiated in case of interrupting the modbus communication
- PLC block ForceHist 5-8 weren't written in the history

15 Changes in the version 1.3.1

15.1 Repairs

- Replacement of incorrect .idx file which has influence on the Firmware import.

16 Changes in the version 1.3.0

16.1 New features

- Allowed communication with Modbus ECU
 - In sw version 1.3.0 there is implemented support of Modbus ECU.
 - Support of the module CD200 was temporarily removed and will be implemented in the form of ECU List.
 - Shall the customer need an immediate communication with the CD200 module, I-CB Modbus can be used for this purpose.
- Support of Controller address value in PLC
 - Controller address value can be now used in PLC like standard analog value.
- Support of AirGate status value in PLC
 - AirGate status value can be now used in PLC like standard analog value.
- New range of Service Time SD
 - 0 – 199 999(OFF) is new range.
- MinPowerPTM is not derated with function Derating power.
 - MinPowerPTM is now not derated by any derating function
- New AFR screens added
 - In case using AFR module there are automatically generated AFR screens for IV5, IV8 and IV12 displays
- New LBO AnyOthGCBClose
 - LBO is used in MINT or Combi archive.
 - LBO signalize that any other GCB in same logical group is closed.
- Changed range of the Generator frequency protection limits
 - Gen>f (0.0 - 5.0) Hz
 - Gen<f (-5.0 - 0.0) Hz
- Changed range of the Mains frequency protection limits
 - Mains>f (0.0 - 5.0) Hz
 - Mains<f (-5.0 - 0.0) Hz
- Changed range of the setpoint GtoM AngleReq
 - GtoM AngleReq $\pm 120^\circ$
- New statistic value Day kWhours
 - Value is reset always at 0:00.00
- New commands for Service time reset placed in the IV12T
 - Commands are available on the second screen of the IV12T
 - Commands are active in case the user is logged
- Enabled Force value for Setpoint Mixer mode (AUTOMATIC/MANUAL)

- DxLoad function modification
 - New Setpoint:
 - Name: KnockingReduct
 - Range: MinPwrPtm...100%
 - Dimension: %
 - Resolution: 1
 - Force value: YES
 - Location: AFR Control
 - New Setpoint
 - Name: KnockProtType
 - Option: Shutdown/Slow stop
 - Force value: NO
 - Position: AFR Control
 - In case the LBI: DxLoadReduct is active, the actual power is reduced to the value given by Setpoint: KnockingReduct and the countdown timer is active. Countdown timer is given by Setpoint: Knocking del. After the countdown timer is counted down is activated type of protection given by Setpoint: KnockProtType.
- Increased internal buffer for CAN1 communication and changed the feature of history log recording for CAN1 buffer
 - History log is only for internal use in case of very special troubleshooting needs
 - In IntelliMonitor could be this log hidden
 - Setting-History – "Hide system records"

16.2 Repairs

- Fixed non functional Force value on Setpoint Sync/Load ctrl: Speed gov bias
- Value Active power req is regulated down when power derating end is set under MinPowerPTM
- Unwanted power limitation
 - When at least one of capability curve (CapabilityQ L or CapabilityQ C) in User sensor was missing, requested power was limited by parameter Nominal power which has been set in the controller in the moment when the controller goes through a Reset (e.g. after programming is finished, or after power is switched On).

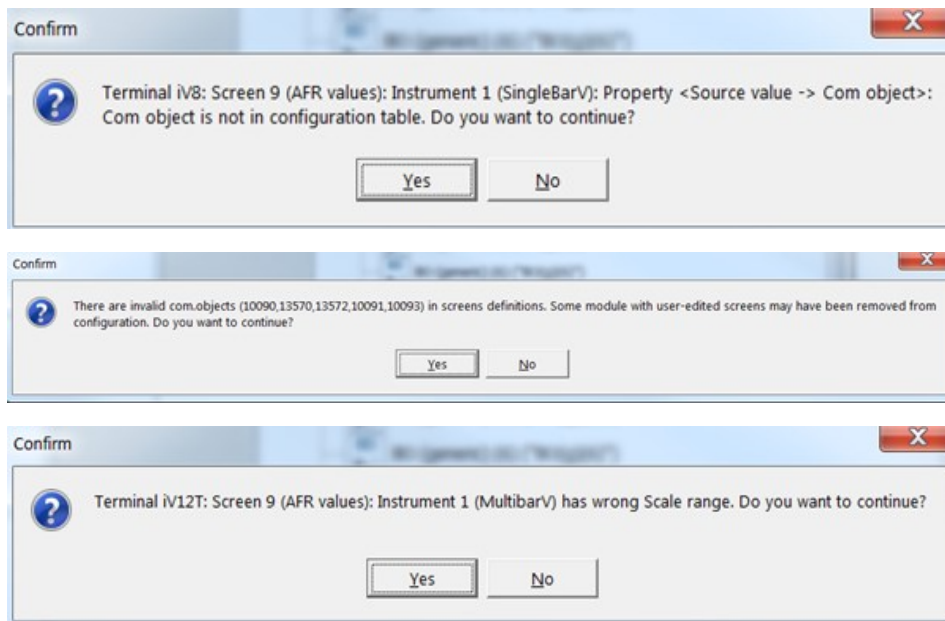
17 Notes

17.1 GenConfig

For configuration has to be used GenConfig version 3.11.3 and higher.

17.2 Predefined AFR screens

During the configuration upload to the controller when the AFR module is not configured, GenConfig will come with 3 Warning messages. These messages are informing you, that some predefined screens (the AFR screens) are missing some values. If you are not using the AFR module, please ignore these messages and confirm them by pressing Yes.



When the AFR module is configured, the messages do not pop-up.

17.3 Document history

Revision number	Related sw. version	Date	Author
24	2.4.0	23.7.2025	Tomáš Kratochvíl
23	2.3.0	8.4.2025	Miroslav Dvořák
22	2.2.0	6.12.2023	Ján Schrötter
21	2.1.0	2.5.2023	Ján Schrötter
20	2.1.0	14.4.2023	Ján Schrötter
19	2.0.0	23.3.2023	Ján Schrötter
18	1.10.0	24.5.2022	Richard Gazdík
17	1.10.0	12.5.2022	Daniel Madara
16	1.9.1	16.03.2022	Daniel Madara
15	1.9.0	14.07.2021	Daniel Madara
14	1.8.0	21.04.2021	Daniel Madara

Revision number	Related sw. version	Date	Author
13	1.7.1	10.04.2021	Daniel Madara
12	1.7.0	24.04.2020	Daniel Madara
11	1.6.0	13.02.2020	Daniel Madara
10	1.6.0	17.12.2019	Daniel Madara
9	1.5.0	08.04.2019	Lubomír Brož
8	1.3.1	15.06.2018	Lubomír Brož
7	1.3.0	07.11.2017	Lubomír Brož
6	1.2.1	02.08.2017	Lubomír Brož
5	1.2.0	27.04.2017	Lubomír Brož
4	1.1.2	23.11.2016	Lubomír Brož
3	1.1.1	23.09.2016	Lubomír Brož
2	1.1.0	30.06.2016	Lubomír Brož
1	1.0.0	05.04.2016	Lubomír Brož