

Release Notes

Perception & GEN Series Firmware

Version v8.60

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1 Update information

These release notes describe changes in Perception (including GEN series firmware) V8.60.

2 Mid and long-term support roadmap

Starting with Perception V8.00 some legacy features, mainframe and card support are no longer present. (A Perception V7.6x maintenance version is available for critical bug fix support.)

2.1 Supported on latest Windows versions

Including all updates until June 2023:

- Windows 10 Pro 1607 and higher (64 bit only)
- Windows 11 Pro

Installation requirements:

- Dot Net Framework V4.8 (distributed with the install CD and available for download on the internet)
- Microsoft Direct3D® capable graphics card.

2.2 Downgrade

Perception V8.60 can be downgraded to the following versions.

Note: When an EtherCAT card is installed, a downgrade to any version before V8.28 must go through version V8.28 first.

- Perception V8.5x
- Perception V8.4x
- Perception V8.3x
- Perception V8.2x
- Perception V8.1x
- Perception V8.0x
- Perception V7.6x
- Perception V7.5x

3 Perception Versions

Version	Description	
	Perception Standard	Free
1-PERC-AD-0x	Perception Advanced	Paid
1-PERC-VA-0x	Perception Viewer Enterprise	Paid
1-PERC-E64-0x	Perception Enterprise	Paid

Perception supports the following application extensions:

Version	Description	
1-PERC-OP-EDR	eDrive application (setup, live and efficiency mapping table)	Paid
1-PERC-OP-STL	Advanced High Voltage/High Power analysis according STL standards	Paid
1-PERC-OP-HIA	High Voltage Impulse Analysis	Paid
1-PERC-OP-CSI	CSI Runtime extensions (Customized Software Interfaces)	Paid

4 Known Issues

Perception settings	Mainframe settings changed via the Fieldbus remote control are not updated in the UI. Reconnecting to the mainframe will show the changes.
Perception recording	When in Perception -> Settings -> Acquisition all optional storage is disabled, the recording will not stop the normal way. It will stop after a timeout of several minutes.
Split recording and RTFDB functions	When using the option for split recording (in Perception go to File -> Preferences... -> Perception -> Recordings) together with one of the RTFDB functions TimedMean(), TimedStdDev(), NumSamplesMean() or NumSamplesStdDev(), the different parts of the recording will remain locked until the end of the acquisition.

5 New Features

5.1 Perception – General new features

Add hardware settings to a recording stored on a mainframe

In the GHS/Perception system, each GHS mainframe contains several hardware settings that influence how signals are measured (e.g., the range used for measuring a signal, filter settings). Therefore, in order to know exactly how a recording was made, it is important to have access to the hardware settings of all the mainframes that were involved in the recording. Up until now, when a recording was made by storing all the data directly on the internal disk of each mainframe (as opposed to storing all or some of the data on PC), the hardware settings of each mainframe were not available in the recording. In the new release, it is possible to include the hardware settings of a mainframe in the recording written to the mainframe's internal disk. In Perception, go to File → Preferences → Perception → Recordings and check the box in front of 'Store settings in mainframe recording'. If afterwards the recordings on each mainframe are merged into a single recording, the hardware settings of each mainframe are then also available in the merged recording. See also the feature 'Semi-automatic merge of mainframe data' in these release notes for further information.

Automatic merge of mainframe data

In the GHS/Perception system, it is possible, and sometimes necessary, to store a recording partially or completely on the internal disc of a GHS mainframe. In this release it has been made possible to automatically merge the different parts of a recording into a single recording file on a PC. In Perception, go to File → Preferences → Perception → Recordings. In the 'Automerge of mainframe recordings' box, check the box 'Enable automerge of recording' if an automatic merge should take place and select when the merge should be done. Furthermore, a location for the merged recording can be selected and optionally, the original files can be deleted after the merge has been completed. Merging can be done as a background process while a new recording is going on. An additional improvement in this context is that the speed of transferring a recording from a mainframe to the PC was increased by a factor 2.

Rework of the Spectral Display including new features

In Perception, the Spectral Display can be used to represent time signals in the frequency domain (in Perception, in the menu bar or in an empty space, click the Spectral Display icon and link it to a time domain Display). In this release, the Spectral Display was completely reworked with the following new or updated functionalities.

- The user can select for which signals in the linked time domain Display the spectrum should be shown. This avoids clutter in the Spectral Display when there are many signals in the time domain display and hence many spectra in the Spectral Display. In the Spectral Display, right-click → Properties and in the Trace Selection tab, add signals to or remove signals from the 'Selected channels:' box.
- In Review while recording, it is now possible to always show the spectrum for the newest part of the recording such that near-real-time spectra can be shown, also when averaged spectra are specified. Although the Live view of the Spectral Display also shows real-time spectra, it cannot show averaged spectra. In the Spectral Display, right-click → Properties and in the Display Setup tab, in the box 'Data shown in Review while recording', select 'Show newest data'.
- Averaged spectra are the result of averaging individual spectra which together cover a certain time interval. This time interval, or averaging area, is indicated in the time domain Yt display by two cursors. Additional lines between the two cursors indicate the time interval over which the newest single spectrum that was added to the average is calculated. In Review mode, moving the additional lines in the time domain Display by pushing the replay control 'Next frame' at the bottom of the Spectral Display, adds individual spectra one at a time to the average until the end of the averaging area is reached. This makes it possible to see how the average changes over time when spectra are added. In the previous version of the Spectral Display, only the 'Next frame' button could be used. In the new release also the 'Previous frame' button can be used to facilitate navigation through the spectra that make up an average spectrum.
- As explained in the previous bullet, when doing spectral averaging, in the time domain Yt display, for a single linked Spectral Display, there are two cursors (indicating the averaging area) and two additional lines between the cursors (the newest time interval for which a spectrum is calculated). When doing no averaging, only the lines indicating the newest time interval are shown. When more than one Spectral Display is linked to a single time domain Yt Display, it is unclear which set of cursors is related to which Spectral Display. In the new Spectral Display it is possible to choose the color of the cursors making it easier to link a time interval to a spectrum. In the Spectral Display, right-click → Properties and in the Display Setup tab, in the box 'Frame cursor colors in Yt display' and select the colors for the newest time interval (Active frame) and the Averaging area.
- The Kaiser-Bessel window was added as a possible choice for time domain windowing. In the Spectral Display, right-click → Properties and in the Spectral Settings tab, in the box 'Time window', select Kaiser-Bessel from the drop-down menu.
- Spectra can now also be displayed as A-weighted, which is useful when spectra are related to sound signals. In the Spectral Display, right-click → Properties and in the Grid and Scaling tab, in the box 'Y axis', select 'A-weighted (dB)' under the header 'Grid'.

In the Measurement Uncertainty sheet, support for new hardware was added

The measurement uncertainty (MU) of a measurement depends on the properties of the used hardware (sensors, acquisition cards, etc.) which should be incorporated in the MU calculations. In the Measurement Uncertainty sheet, support was added for the T12 w-version torque sensor (but not yet for the minimal torque value of 100Nm). Furthermore, support for the GN610B/GN611B acquisition card was added, as well as support for burden resistors to allow for measuring both voltages and currents with those cards. After loading the 'MU Estimation (Basics)' sheet, the GN610B card can be selected from the drop-down menu under 'Used Acquisition Card'. When the GN610B card is selected, the current should be measured using 'Card&HBR & CT' and from the drop-down menu with 'HBR:', the type of burden resistor can be selected. As before, the CT can be selected from the drop-down menu with 'CT:'. The T12 w version can be selected under 'Torque' and the 'Sensor' in the 'Mechanical Power' part of the sheet.

Allow publishing any value on the fieldbuses in case of an invalid signal

In some cases, the system cannot generate signal values. An example of such a situation is when in auto-ranging mode the range is being adapted. In those cases, for a short time, a signal will not be valid. When such signals are published on the fieldbuses, Not a Number (NaN) is published. Since not all external systems can easily handle NaN, it is now possible to select a user-defined value when a signal is not valid. In Perception, go to Settings → Real-time Data → Publishing and under 'General settings', select 'Specific value:' and specify the value to be published in case a signal is not valid.

Allow triggering of signals in Live display based on cycles

In the Live display in Perception, signals are often not stable but 'running', just like in an oscilloscope that is not triggered. In the new release, it is possible to trigger signals based on cycle signals. Periodic signals related to a selected cycle signal will then be stable in the Live display. To choose which cycle signal to use for triggering, in the hamburger menu of the Live display (three small horizontal lines in the top-left), choose 'Cycle trigger...' and in the roll-down menu, select the cycle signal to be used for triggering the display. For this functionality is available in Perception and not yet in the ePower suite.

5.2 Perception – New ePower Suite Features

Using field bus signals, allow easy detection if a setup is in steady-state

A setpoint of an eDrive setup (e.g., the efficiency for a certain torque/speed combination), is commonly measured when a system is in steady-state. In the new release, additional RTFDB functions can be instantiated by the ePower suite which, for a number of relevant signals, determine the mean and standard deviation. If those signals are published on the field buses, this allows an external automation system to easily determine if the setup is in steady-state by looking at the standard deviation or the ratio of the standard deviation and the mean. The user can determine how the samples to determine this mean and standard deviation are selected in terms of a specified number of samples or as a time interval: in the ePower suite, go to Generic settings and in the 'Sample selection for designated Mean/StdDev signals' area, choose how the samples should be selected. The default selection for new ePower suite setup can be done in Perception by loading the ePower suite, go to File → Preferences → ePower suite → Generic and in the 'Sample selection for designated Mean/StdDev signals' area, choose how the samples should be selected.

5.3 New Features for Hardware

XCP over Ethernet This command is used to synchronize command execution after timeout conditions. This release supports the functionality of “XCP Over Ethernet – Output” which means data from the mainframe (slave) can be read by the master via XCP. In Perception, Real time data -> Publishing , a new column “Publish to XCP over Ethernet” will be available to allow publishing like existing fieldbus. For generating the A2L file, “Save A2L file as...” button is available. The following Standard commands** are currently supported which allows/maintains the XCP master and slave connection:

CONNECT	This command sets up connection with slave. It establishes a continuous, logical, point-to-point connection with a slave device.
DISCONNECT	This command allows to disconnect from slave . Brings the slave to the DISCONNECTED state.
GET_COMM_MODE_INFO	This command returns optional information on different Communication Modes supported by the slave.
GET_STATUS	This command returns all current status information of the slave device. This includes the status of the resource protection, pending store requests and the general status of data acquisition and stimulation.
SYNCH	This command is used to synchronize command execution after timeout conditions.

The following **Data Acquisition commands** are currently supported which allows to read data from XCP slave by the XCP master:

- Static DAQ list configuration:
 - GET_DAQ_CLOCK, GET_DAQ_PROCESSOR_INFO, GET_DAQ_RESOLUTION_INFO, SET_DAQ_LIST_MODE, SET_DAQ_LIST_MODE_SHORT, SET_DAQ_PTR, SET_DAQ_PTR_SHORT, START_STOP_DAQ_LIST, START_STOP_DAQ_LIST_SHORT, START_STOP_SYNC, START_STOP_SYNC_SHORT, WRITE_DAQ, WRITE_DAQ_INTEL, WRITE_DAQ_SHORT
- Dynamic DAQ List Configuration:
 - ALLOC_DAQ, ALLOC_DAQ_INTEL, ALLOC_DAQ_SHORT, ALLOC_ODT, ALLOC_ODT_SHORT, ALLOC_ODT_ENTRY, ALLOC_ODT_ENTRY_SHORT, FREE_DAQ

Known Limitations for 8.60 release:

1. This has been tested using CANape ONLY.
2. There are known issues with ETAS Inca and is being worked upon for next minor releases.
3. This is NOT supported for integrated systems.

Mainframe control via EtherCAT PDO	<p>This is the first major release which will allow mainframe control via EtherCAT PDO. On EtherCAT, several communication protocols are available. Up until now, GHS provided Remote Control via EtherCAT CoE (CAN over EtherCAT), but only SDO as the supported mechanism. From this release onwards, PDO will be supported as well.</p> <p>Two new PDO objects were added: One for receiving ("Remote Control (Rx)") and one for transmitting Remote Control messages ("Remote Control (Tx)"). They include the following entries: Command, Recorder, Channel, Value, and for the Tx PDO an extra ReturnCode entry for status information.</p> <p>For PDO, data is exchanged in the EtherCAT bus every cycle so a handshake mechanism was implemented to avoid running the same command unnecessarily every cycle. If the command entry is different, the operation is executed, otherwise is ignored. If the user wants to run the same command (e.g. changing recorder, channel, or value entries) then it must first switch the command entry to NoOp (Command 0x00) and then change back to the desired command. The command structure is the same as the previously implemented FieldBus Remote Control used in EtherCAT SDO and CAN.</p> <p>FieldBus Remote Control documentation maybe referred for more information on the available commands and how to use them and return code description.</p> <p>Known Issues:</p> <p>This issue is intermittently observed during Conformance Tool Test. The impact of this to end user is very low or no impact.</p> <p>During transition from Operational to Safe Operational there can be a conflicting deactivation of Sync Managers where one of the Sync Managers should remain enabled. During transition from Operational to Safe Operational an Invalid AI Status can sometimes be reported.</p> <p>If issues are observed, performing a controlled system reset will help in restoring proper functionality. This can clear temporary faults or errors caused by the transition to SafeOp.</p>
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5.4 Improvements in Perception

Modernized the look-and-feel of Perception	Many of the icons and graphics were updated to give a more modern look-and-feel and to improve usability.
Prevent large MatLab/MDF4 export files due to asynchronous signals	Asynchronous signals are the results of cycle-based processing and the time between samples is at least 0.5ms. When exporting, those signals were resampled at a high sample rate leading to large files. In the new release, when exporting signals from Perception to Matlab or MDF4, it is now possible to export asynchronous signals as asynchronous signals, or resampled at a lower user-defined sample rate leading to significantly smaller file sizes for those formats. This option can be found in the regular export dialog (File → Export Recording ...).
Improve how a user can see and print the hardware settings from a recording	Up until now, hardware settings of a recording could be printed by loading a recording as Active, and then selecting File → Print → Settings from file... after which the active recording had to be loaded again. Two additional entries in the Print sub menu to make this easier: 'Settings from active recording...' and 'Settings from current settings...' .
Report CAN signal definition errors in Perception	When a wrong definition of the setup of CAN channels is provided, Perception now gives an error message such that the setup can be corrected.
Add key-mouse combination for temporarily grouping of cursors	Grouping cursors means that the grouped cursors move together when dragging one of the grouped cursors. Currently the user has the option to group/ungroup cursors by pushing a button in the menu bar. To improve usability it is now possible to press the Alt-key, drag one of the cursors and the related cursors will move as a group. This works for horizontal, vertical and slope cursors.

5.5 Improvements for Hardware

No special license for RTFDB on CAN inputs	Perception 8.50 required a special license to allow processing CAN signals in the RTFDB. This feature is free of charge for customers within Perception maintenance, so licensing is no longer required.
Allow for unsigned/signed 16-bit CAN inputs	Next to 32-bit and 64-bit signed and unsigned CAN signals, we now also allow for 16-bit signed and unsigned CAN input signals.
Allow integrating asynchronous samples	The IntegrateGated() function in the Real-time formula database allows signals to be integrated over a time interval where the start of the integration and the length of the integrated interval can be controlled from the field buses in a flexible manner. Up until now, this function could only handle synchronous signals to be integrated (such as instantaneous electrical power) but not asynchronous signals which are used, for example, to describe the instantaneous mechanical power. From this release, the IntegrateGated() function can also handle asynchronous signals.
Additional CAN sample rates	<p>In previous releases, all CAN input signals to a GHS mainframe were sampled at a rate of 100S/s. It is now possible to choose a different sample rate for each CAN recorder. When choosing a higher sample rate, the maximum number of allowed channels is reduced. The constraint is that the sum, over all CAN recorders, of the product of the sample rate and the number of channels should be lower than 100,000. Some feasible examples are as follows:</p> <ul style="list-style-type: none">• 1000 channels at 100S/s• 500 channels at 200S/s• 200 channels at 500S/s• 100 channels at 1000S/s• 40 channels at 2500S/s• 25 channels at 2500S/s, and 30 channels at 500S/s, and 15 channels at 100S/s, and 75 channels at 100S/s <p>NOTE that due to resource limitations the GEN2tB only offers a single sample rate of 100 S/s for CAN input signals.</p>

6 Improvements

6.1 Support items and requests

Averaging in Spectral Display always Peak hold average	SUPEPT-112	In the Perception Spectral display, the averaging was always peak-hold rather than the selected linear or exponential. This issue is fixed such that now the proper averaging is done.
CAN bus stopped unexpectedly	SUPEPT-218	A problem is solved where the CAN bus stopped unexpectedly.
Fundamental calculation issue on RT-FDB	SUPEPT-243	A problem with cross-board cycle signals used for doing fundamental calculations was solved.
Change of conditional Start/Stop time does not work during the recording	SUPEPT-270	In Perception it is possible to conditionally start or stop a recording. Up until now it was possible to change the conditions during a recording which might lead to unexpected or undefined situations. In this release it is no longer possible to change conditions during a recording such that the conditions are always well-defined.
Graphical problem in Report sheet tables in Perception	SUPEPT-271	A problem with columns width when automatically generating a report was solved.
User defined display color is not permanent stored	SUPEPT-273	User-defined colors are now stored as part of the PC settings.
New type of Peak CAN dongle was not accepted	SUPEPT-274	Peak provides the USB CAN dongle with different internal chip sets. The updated Peak dongles are now also recognized and can be used.
Switching display mode to ReviewSweep does show the full recording instead sweep	SUPEPT-278	A problem with switching between Review and ReviewSweep in the time display was solved.
Using macro function auto scale active display y-axis is takes only action on first page of the display	SUPEPT-288, SUPEPT-320	The macro function auto scale active display y-axis now works on all pages of a display.
The format of the displayed value in a marker does not reflect the format set in Properties for the marker	SUPEPT-291	A small formatting discrepancy between marker field and the properties of a marker was solved.
Suppress overrange drawing does not work as expected	SUPEPT-293, SUPEPT-296	Some related issues concerning drawing or suppressing overrange data where solved.
Trace marker not connected to trace line	SUPEPT-297	A trace marker is now always connected to a trace.

Loading existing workbench ends up with incomplete workbench	SUPEPT-299	A problem with connecting to a mainframe specified in a virtual workbench was solved and made more robust.
NaN in log file when doing processing	SUPEPT-308	When using one of the FDB functions (CycleFundamental) the output may give NaN. This problem is solved.
Load Settings menu option doesn't load workbench settings completely	SUPEPT-312	A problem with incomplete loading of working bench settings was solved.
Freeze when duplicating signals for automated recording processing	SUPEPT-315	The system is made robust against selecting the same signal multiple times when doing automated recording post-processing.
Apply a Thermocouple type C sensor, Perception shows type B	SUPEPT-316	A thermocouple type C sensor is now shown as such.
Redo an existing Experiment and load existing Experiment data does not include data	SUPEPT-322	On opening Perception and selecting 'Redo an existing experiment and load existing experiment data', the data was not always loaded. This problem is solved.
Recordings got locked up by Perception	SUPEPT-325	When a recording is finished, it is unlocked and can be accessed by other software. Sometimes the recording was not unlocked and this problem is now solved.
Perception crashing when starting to record	SUPEPT-326	Sometimes Perception crashed when starting a recording. This problem is solved.
Multiple mainframe setup crashing after 10 minutes into recording	SUPEPT-327	In a high-load multiple mainframe setup, the system crashed after 10 minutes of recording. This problem is solved.
The static hysteresis value in the ePower suite does not adapt automatically with the span	SUPEPT-328	Some RTFDB functions allow inputs only in a certain range. When inside the RTFDB an invalid argument is provided, it is adjusted and a warning is given by highlighting the affected formula. When an invalid argument is set from the ePower suite (like the static hysteresis value) warning are now given at several places.
Split recordings made on mainframe are not complete	SUPEPT-329	With the new split recording functionality, the data in each recording was not complete. This is solved.
Used channel names are incomplete shown	SUPEPT-330	In Perception in the ePower suite, in certain situations the channel name was not completely shown. This is solved.
Allow segments shorter than 10 seconds in a split recording	SUPEPT-332	In an earlier release, split recordings were introduced allowing to, during the recording process, generate several small subrecordings rather than one single large recording. The minimum time interval covered by such a subrecording was 10 seconds but is now reduced to 1 second. Go to File → Preferences... → Perception → Recordings and, in the Recording creation box, check 'Split continuous recording into subrecordings after', and choose the length of each part of the recording in seconds.

No MDF4 file when exporting using automated processing	SUPEPT-333	The problem of a missing MDF4 file when exporting using automated processing was solved.
Sluggish behavior when loading a virtual workbench	SUPEPT-337	In some case, Perception could react in a sluggish manner when loading a virtual workbench. This problem is solved.
Perception diagnostics increased 1GB per day	SUPEPT-342	A problem with a fast growing Perception diagnostics files was solved.
Usage of ratio is wrong in rt formulas for gearbox	SUPEPT-356	In the ePower suite, an RTFDB formula that is instantiated when using the artificial gearbox components contained an error which is now solved.

7 Deprecated support

The following is no longer supported within Perception:

- GPS2750

8 Supported Genesis HighSpeed Mainframes

The following Genesis HighSpeed Mainframes are supported:

- GEN2tB
- GEN3t
- GEN4tB
- GEN7tA
- GEN17tA
- GEN3i
- GEN3iA
- GEN7i
- GEN7iA
- GEN7iB
- GEN7tB
- GEN17tB
- BE3200

9 Supported QuantumX Modules

Note: The support of QuantumX Modules in Perception will stop with future versions of Perception! QuantumX modules can be integrated in systems with tethered mainframes using the CAN-interface together with a QuantumX MX471C.

The following QuantumX models are supported:

- MX1609KB
- MX1609TB
- MX471B
- MX809B
- CX27B as single network access point only, no setup or control of CX27B

Patents no: 7,868,886

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