

BRÜEL & KJÆR® Data Analysis Software

BK Connect Data Viewer

Data Viewer Module, File Importer Options and Team Server

BK Connect[®] is a fully integrated solution for multi-channel data acquisition (using our industry-leading LAN-XI hardware), data processing, data management and reporting. The innovative user interface is easily customized so you can adapt it to the needs of different users within your organization enabling expert users and operator technicians to work together with maximum efficiency and high productivity.

The core applications of BK Connect are designed for generalpurpose sound and vibration engineering. Together they provide a comprehensive set of tools for real-time measurements and data processing with the flexibility to deal with a wide range of engineering scenarios – from repetitive, standardized testing to complex troubleshooting investigations.



Uses and features

Uses

- · General vibration and acoustic data analysis
- Data management find, display and compare measurement and analysis data
- · Import and export of data to and from an analysis project
- Simple and efficient reporting of results with user-definable layouts and user-selectable metadata
- · Sharing of data across a team

Features

- Project database based on a local Microsoft[®] SQL Server[®]
- Project data storage also available via a local Team Server repository on the PC
- Powerful data viewing
- User-controllable use of metadata for sorting and filtering of displayed data
- Embedded reporting using Microsoft[®] Office products to integrate report writing into the test process
- Fast, template-based automated reporting to Microsoft[®] Word and PowerPoint[®]
- User interface and data organization optimized to fit your workflows, allowing multiple tests, setups and applications inside a single project
- · Easy to learn and use, reducing training and test time

www.bksv.com Product Data BP 0005 - 22

The core applications of BK Connect are:

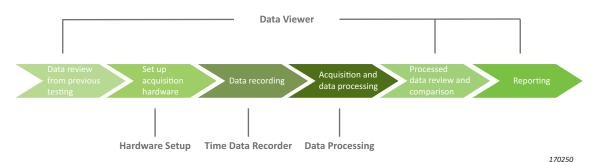
- · BK Connect Data Viewer for data management, viewing and reporting
- BK Connect Hardware Setup for setting up transducers and front-end hardware
- BK Connect Time Data Recorder for dedicated time data recording and review
- BK Connect Data Processing for real-time measurements and time or function data processing

Each of these applications is designed as a self-contained solution for a typical task or set of tasks within test and analysis. Select the module or modules that will help you perform the task, or combine applications to increase functionality and create super-efficient workflows for quick and easy completion of multiple steps in a sound and vibration test process.

Fig. 1 BK Connect core applications

BK Connect

Core application modules that enable quick and easy testing at each step of the process



Licencing that fits your needs

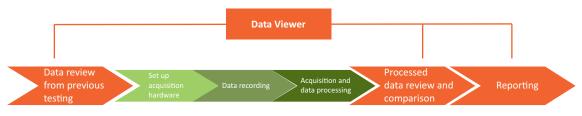
BK Connect Data Viewer Type 8400, a free licence, is the prerequisite for all applications except BK Connect Hardware Setup.

The four core applications can all be used stand-alone or incorporated into the main application, BK Connect Data Processing. On its own, Data Processing is purely for time or frequency data post-processing, however when the Hardware Setup licence is present, you can also measure in real time. When the Time Data Recorder licence is present, you can simultaneously record and post-process test data to quickly produce your final results and/or reports.

BK Connect Data Viewer

BK Connect Data Viewer

The base application modules that provide project and data management, basic data comparison and integrated reporting



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BK Connect Data Viewer provides tools for working with files or your local database, defining metadata, performing database searches using metadata, data import and export, flexible data display, and report creation.

BK Connect Data Viewer Type 8400 (free licence)

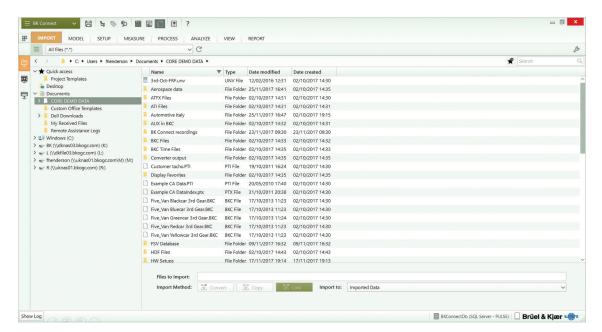
Using Type 8400, you can connect to any BK Connect database, find data using metadata queries, display and compare data, and prepare reports using Microsoft Office tools. You can also import or export data in the native BK Connect (*.bkc) format, which preserves the project, test and setup metadata. When used as a team collaboration tool, you can import a database, project or data file from a colleague, view and compare their data, then create your reports using Microsoft Word or PowerPoint[®] to share with the rest of the team.

Type 8400 tools include:

- · File Import: Import of time and function data files from BK Connect and PULSE Reflex (*.bkc and *.csv)
- Metadata Editor: Set up metadata and the device under test (DUT) for data documentation in the BK Connect database
- Project Browser: Manage data through this essential data management tool. Functionality includes data search, filter, selection and editing of data descriptors
- · Graphical displays: Drag and drop data into a display; copy and paste the displays into a report
- My Data: Organize your data any way you wish. Copy data from any application in the current project, or drag & drop data from other projects in the database via the Search tool
- Reporting: The Report Organizer gives a complete overview of available templates and generated reports.

 Create reports from supplied templates or use an existing report to create a new, customized template

Fig. 2 BK Connect Data Viewer provides the fundamental framework and data management components of BK Connect



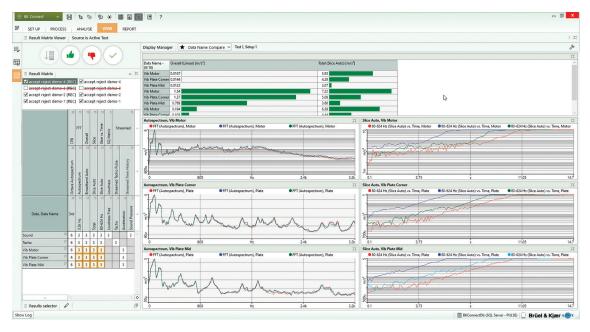
All functionality available in Type 8400 stays intact as you add applications on top of it.

BK Connect Data Viewer (advanced) Type 8400-A

Type 8400-A adds advanced data viewer and reporting features to the base Type 8400 including:

- Data Table Viewer: A highly flexible tabular presentation of large amounts of data with powerful filtering and sorting tools and automated reporting
- Result Matrix Viewer: A structured overview of results from a number of tests, making selection, comparison and reporting very easy
- Matrix Calculator: Standard mathematical and statistical operations can be performed on 2D and 3D functions. The graphical displays in the Matrix Calculator provide basic reporting capabilities
- Export to Excel: From the Project Browser, export data to a Microsoft[®] Excel[®] workbook for easy reporting and sharing

Fig. 3
The Result Matrix Viewer showing five sets of results compared by selecting individual cells in the matrix. The resulting graphical displays are automatically overlaid and the overall metric results are presented in tabular form



Data Viewer file importer options

Five Data Viewer options increase your file format import and export options. All of these modules require a Data Viewer Type 8400 (or Type 8400-NT free viewer) licence.

BK Connect Native File Importers Type 8400-B

The following tools and components are added:

- · File import of any format used natively by Brüel & Kjær applications:
 - from PULSE Time Data Recorder, PULSE LabShop and PULSE Reflex Measurements: *.pti (time data)
 - from PULSE LabShop:*.dat (time data, must also have the ancillary *.rec file), PULSE ASCII *.txt (time and function data)
 - from Test for I-deas: *.ati (time data), *.afu (function data)
 - from HBM[®] Perception[®] and Evidas[®]: *.pnrf and catman[®] *.bin (time data)
 - universal files: *.unv, *.uff (time and function data)
 - wave files: *.wav (time data)
- Import from LabShop and Import from PDM: Interfaces that allow you to import your saved data directly
 from PULSE LabShop or PULSE Data Manager. You can open a PULSE project (*.pls) directly in
 BK Connect and connect to LabShop's Measurement or Function Organizer
- Export to PDM: Store any measured or processed results to their existing local or network PDM database to maintain continuity with their existing data management solution
- Export to Excel: In addition to exporting data to file or exporting entire projects, you can also export data to a Microsoft[®] Excel[®] workbook

BK Connect External File Importers Type 8400-C

File import of external formats:

- from ASAM-ODS: *.atfx (time and function data)
- from DSPCon:*.DATX (time data)
- from Head Acoustics: *.hdf, *.dat (time data)
- · from HBM Somat: *.sie (time data)
- from MTS: *.rpc (time data)
- from HP analyzers: *.sdf (standard data format for time and function data)
- HDF5[®] (hierarchical data format)

BK Connect Finite Element Interface Types 8400-D, E and F

Import of finite element (FE) models can include, apart from geometry data and modal data, also reduced mass matrices (Nastran or Abaqus). This allows for animation of FE modes as well as correlation of finite element analysis (FEA) results with test results. FE models can be imported as UFF files or with the following options, from Nastran, Ansys or Abaqus:

- File import of Nastran FE models: Available with Nastran Interface Type 8400-D
- File import of Ansys FE models: Available with Ansys Interface Type 8400-E
- File import of Abaqus FE models: Available with Abaqus Interface Type 8400-F

Storing data in a database is a relatively easy and safe method when working within a closed software environment. However, if you need to quickly archive data, prefer to have file based archives or you want that extra security of a local backup, then Team Server installed on your PC's hard drive is a good option. If you want to collaborate between team members, who may or may not have the same software, then data sharing on a Team Server shared folder is perhaps the better solution.

Project data storage option

Team Server installed on your local PC provides a seamless solution where data is quickly and easily stored in a repository on your selected hard drive. As data storage in BK Connect defaults to the BK Connect database, this local repository allows you to create a local backup copy as well as simplifies the sharing of data measured and analysed in BK Connect.

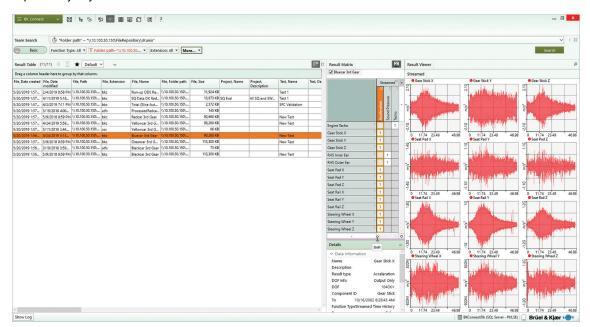
Shared folder across a team

With Team Server installed on a Windows Server[®], collaboration can occur across a shared folder, the repository, that all team members can access. The repository can be installed on the same server as the Team Server (index server) or on a separate network drive.

You share data to the repository simply by right-clicking the data in BK Connect's Project Browser. You can select to share measured, recorded or processed data in any format supported by BK Connect, though the .bkc format is recommended, as it has more attributes available to be indexed, thus making queries much easier.

Using the Team Search tool in BK Connect, data in the repository can be easily queried, previewed and imported by any team member.





The software is delivered via download option or USB installation media. The licence is either: node-locked to a PC host ID or dongle; or floating, locked to a network server

System

PC SYSTEM REQUIREMENTS

- Windows® 10 Pro or Enterprise (x64) with either Current Branch (CB), Current Branch for Business (CBB), Semi-annual Channel (Targeted) or Semi-annual Channel servicing model
- Windows[®] 11 Pro or Enterprise (x64) with either Current Branch (CB), Current Branch for Business (CBB), Semi-annual Channel (Targeted) or Semi-annual Channel servicing model
- Microsoft $^{\! \rm B}$ Office 2019 (x32 or x64) or Office 2021 (x32 or x64)
- Microsoft[®] SQL Server[®] 2019 (SQL Server 2019 Express included with software)

RECOMMENDED PC SYSTEM

- Intel[®] Core[™] i9, 3 GHz processor or better
- 32 GB RAM
- · 1 TB Solid State Drive (SSD) with 100 GB free space, or better
- 1 Gbit Ethernet network*
- Microsoft® Windows® 10 Pro or Enterprise (x64) with CB
- Microsoft® Office 2021 (x32)
- · Microsoft® SQL Server® 2019
- · Screen resolution of 1920 × 1080 pixels (full HD)
- * A dedicated data acquisition network (LAN or WAN) is recommended. A network that only handles data from the front end improves the stability of the data

Specifications - BK Connect Data Viewer Type 8400

BK Connect Data Viewer Type 8400 is the prerequisite licence for all applications (except for Hardware Setup applications). All other applications add functionality to the prerequisite licence

Software Prerequisites

· See system specifications

Import/Export

SUPPORTED DATA FILE FORMATS	.bkc (BK Connect native format) – both function and time data .csv (based on a predefined format): - Recording data (even abscissa time domain) - 2D complex-valued frequency domain data - 2D real-valued frequency domain data (FFT and CPB) - 3D including analysis vs time and order slices
PROJECT FILE IMPORT/EXPORT	Export a project to an external "transport" file (*.BKConnectTemplate or *.BKConnectProject), with or without imported or processed data, for archiving outside the database, sharing with other BK Connect users, capturing a snapshot of a particular state, or creating a project template

Team Server on Local Disk

EXPORT	Measurement and analysis files saved and exported to folder via the Project Browser Does not require Microsoft SQL database
IMPORT	Import data directly in BK Connect project
FILE FORMAT	Works for all of file types supported by BK Connect, however the .bkc file has more attributes available to be indexed
SEARCH DATA	Search using multiple attributes (metadata) Two search methods: Basic: Select search criteria from dropdown menu Advanced: Build search string using standard query syntax Search strings can be stored as favourites for future reuse Get overview of query results in Results Matrix Select one or more results in matrix and view and inspects data in Results Display

Reporting and Data Management

REPORTING	A separate reporting task enables templates to be created in Microsoft [®] Word, Excel [®] or PowerPoint [®] . This is particularly useful for standardized reporting
DATA MANAGEMENT	Data management is based on a data model that interacts with a Microsoft® SQL Server® database. Connection to the last used database is automatic upon starting BK Connect. However, the user can connect to a different database at any time during a session. Only one database can be connected at a time. Local database with each BK Connect installation; optionally accessible via a BK Connect service, one user at a time, over a company network
DATABASE HANDLING	Databases can be created, deleted, backed up and restored
DATABASE MIGRATION TOOL	Tool that allows users to start application using an SQLite database and at a later point migrate data to an SQL Server solution
DATA STORAGE (of data files, report templates, pictures)	Uses a filefarm (on disk) referenced by the database. File sizes limited by disk only
METADATA AND DEVICE UNDER TEST	Defined by the user as a method to document valuable information about the test. Enables customized searching for input data and results on the BK Connect local database
DATA SHARING	Via external BK Common file enables one file to contain all results from a common source, including their metadata

User-defined Display

The User-defined Display task is the container for displaying graphical results. Displays enable viewing and comparison of measurements and results. Data is dragged-and-dropped to/from the Project Browser

Data Display

GRAPH TYPES	Display of functions in a including:	range of graph types
	Waterfall Waterfall (step) Colour contour (3 variants) Campbell diagram Bar	Curve Curve (step) Overlay Uverlay (all) Multi-value Line
SUPERIMPOSED GRAPHS	A number of functions c the same curve graph	an be superimposed on
AXES	 X-axis Scale: Linear, logarithmic and CPB Y-axis Scale: Linear, logarithmic and dB Z-axis Scale: Linear and logarithmic 	
COMPLEX DISPLAYS	RealImaginaryMagnitude	PhaseNyquistBode
SPECTRAL UNITS	Root mean square (RMS) Power (PWR) Power spectral density (PSD) Root mean square spectral density (RMSSD)	Energy spectral density (ESD) Peak (Peak) Peak-to-Peak (PkPk)

ACOUSTIC POST- WEIGHTING	A-, B-, C-, D-, L-weighting	
jω WEIGHTING	$1/j\omega^2$, $1/j\omega$, $1, j\omega$, $j\omega^2$ (single and double integration and differentiation)	
CURSOR TYPES	Depending on the displa available: • Main • Delta • Order	y type, the following are Reference Harmonic Sideband
ALIGNMENT	Cursors in different displays can be synchronized to allow the changes to one display to be reflected in other displays showing the same or different functions	
CURSOR READINGS	Acoustic levels Corrected frequency Cursor indices and values Delta Delta/total Max. and min. values Nearest harmonic	Nearest sideband Reference Resonance Reverberation Slice definition Status Total

Specifications - BK Connect Data Viewer (advanced) Type 8400-A

Software Prerequisites

• BK Connect Data Viewer Type 8400 or 8400-NT

INCLUDED LICENCES

 PULSE Data Manager Type 7767-A (PDM) licence – database solution for legacy PULSE LabShop applications

ADDED FUNCTIONALITY TO TYPE 8400

- Data Table Viewer sub-task enables review and display of project data
- Result Matrix Viewer sub-task provides a structured overview of results from a large number of tests, making selection and comparison very easy
- Matrix Calculator sub-task provides standard mathematical and statistical operations
- · Export to Excel

Data Table Viewer

DATA SOURCE	Drag and drop from Project Browser
DATA OVERVIEW	 Data table with user-configurable columns. Can contain a wide range of data descriptors, including user-defined metadata Advanced filtering and sorting capabilities using a combination of columns, providing a powerful way to focus on any data of interest
DATA SELECTION	 Controls in header bar enable table selections to be automatically incremented for quick and easy scanning through the entire data set Automatic data presentation in graphical displays. Auto-filled based on data selection in the table
DATA HANDLING	Automatic report generation based on the data selection in the table

Result Matrix Viewer

RESULT SOURCE	Drag and drop from Project Browser
RESULT OVERVIEW	Result layout as a matrix of signals versus analyses Smart results grouping – each individual cell in the matrix represents a group of similar results for which comparison is valid
RESULT SELECTION	Automatic result data presentation – selecting a cell presents the results, either in a table view for scalars, or graphical display for function data
RESULT HANDLING	Automatic report generation – reports can be generated in either Microsoft® Word or PowerPoint®, either from blank documents, or from templates prepared in advance. Template creation is controlled directly from the Data Viewer and is both flexible and easy to perform

Matrix Calculator

FUNCTION MATH	Operates on a function sele single selected function Add Subtract Multiply	Divide Addition in dB Subtraction in dB
FUNCTION OPERATORS	Natural logarithm: Ln Inverse Ln: e to the power of the function amplitude Logarithm to the base 10: Log10 Inverse Log10: 10 to the power of the function amplitude Reciprocal Square Root Square Raise to power, x^y Absolute Value To dB: Convert amplitude of a function to dB values with a user-defined reference	To Real: Result is a function containing real values from selected complex function To Imaginary: Result is a function containing imaginary values from selected complex function To Magnitude: Result is a function containing magnitude values from selected complex function To Phase: Result is a function containing phase values from selected complex function Conjugate: Result is complex conjugate of selected complex function
SCALING	Operates on a function sele Scale by Real: multiply selected functions by real-valued scalar Scale by Complex: multiply selected functions by complex-valued scalar	Scale by Averaging Time: Multiply selected functions by the averaging time, for example, to get sound exposure levels (SEL, ASEL,)

STATISTICS	Operates on a function sele	ection, single value output
FUNCTION	Mean Value Standard Deviation Variance Skewness Kurtosis Operates on a function sele	Max Value Min Value RMS Value Crest Factor Sum Value ection, single function
STATISTICS	output	-
	Mean Standard Deviation Mean minus Standard Deviation Mean plus Standard Deviation	• Min • Max • Sum
FREQUENCY WEIGHTING	Coperates on a function selection. Linear Weighting: Remove weighting from spectrum A-Weighting: Apply Aweighting (removing existing weighting first) B-Weighting: Apply Bweighting (removing existing weighting first) C-Weighting: Apply Cweighting (removing existing weighting first)	D-Weighting: Apply D-weighting (removing existing weighting first) Single Integration Double Integration Single Differentiation Double Differentiation
INTER- POLATION	Operates on a function sele Linear vs Frequency: Interpolate frequency values according to min, max and interval Linear vs RPM: Interpolate rpm values according to min, max and interval	Linear vs Time: Interpolate time values according to min, max and interval

Specifications - BK Connect File Importer Options

Types 8400-B, C, D, E and F are options that enable expanded data import and export functionality to all BK Connect applications

Software Prerequisites

• BK Connect Data Viewer Type 8400 or 8400-NT

Native File Importers Type 8400-B

Adds following import and export functionality to any application:

FILE FORMATS	Used natively in Brüel & Kjær applications: • .pti (PULSE time data) • .dat (time data, must also have the ancillary *.rec file) – import only • .txt (PULSE ASCII time and function data) – import only • .ati (Test for I-deas time data) • .afu (Test for I-deas function data) – import only • .unv and .uff (time and function data) • .wav (time data) • .pnrf (HBM Perception and Evidas time data) • .bin (HBM catman time data)

IMPOR	T/EXPORT	 Import from LabShop and Import from PDM sub-tasks: Direct import from LabShop Measurement and Function Organisers PULSE ASCII files can be exported from both PULSE LabShop and PULSE Data Manager (PDM) to BK Connect Export to Excel Files linked either to a project in their original format (at their original location) and worked on without converting to native BK Connect format, or copied and converted to BK Connect format, bringing them under control of the BK Connect database Export to PDM allows any measured or processed data to be stored in an existing local or network PDM database Included PULSE LabShop Viewer Type 7709
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Nastran Finite Element Interface Type 8400-D

database

Files linked either to a project in their original format (at their original location) and worked on without converting to native BK Connect format, or copied and converted to BK Connect format, bringing them under control of the BK Connect

Adds following importing functionality to any application:

· Nastran finite element models (MSC, NEi and NX)

Ansys Finite Element Interface Type 8400-E

Adds following importing functionality to any application:

· Ansys finite element models

IMPORT/EXPORT

Abaqus Finite Element Interface Type 8400-F

Adds following importing functionality to any application:

· Abaqus finite element models

External File Importers Type 8400-C

Adds following import and export functionality to any application:

BK Connect Team Server Type 8400-T-FY

Software Prerequisites

- BK Connect Data Viewer Type 8400 or 8400-NT
- Installation of Team Server (see product data BP 0016)

Team Data Sharing

EXPORT	 Measurement and analysis files saved and exported to a shared Team Folder via the Project Browser Does not require Microsoft SQL database
IMPORT	Import data directly in BK Connect project Share data between BK Connect users for use in multiple projects and/or further post-processing
FILE FORMAT	Works for all of file types supported by BK Connect, however the .bkc file has more attributes available to be indexed

SEARCH DATA Search network using multiple attributes (metadata) Two search methods: Basic: Select search criteria from dropdown menu Advanced: Build search string using standard query syntax Search strings can be stored as favourites for future reuse Get overview of query results in Results Matrix Select one or more results in matrix and view and inspects data in Results Display

Type 8400-NT	BK Connect Data Viewer (free viewer)
Type 8400-X	BK Connect Data Viewer
Type 8400-A-X	BK Connect Data Viewer (advanced)
Type 8400-B-X	BK Connect Native File Importers
Type 8400-C-X	BK Connect External File Importers
Type 8400-D-X	BK Connect Nastran Interface
Type 8400-E-X	BK Connect Ansys Interface
Type 8400-F-X	BK Connect Abaqus Interface
Type 0400-F-X	Dit Connect Abaqus Interrace

Other BK Connect Software Modules and Packs

DATA ACQUISITION	APPLICATION MODULES
Tyne 8401-X	BK Connect Hardware Setup

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Type 8401-A-X	BK Connect Hardware Setup (advanced)
Type 8401-V-X	BK Connect Virtual Hardware Setup

DATA RECORDING APPLICATION MODULES

Type 8402-X **BK Connect Time Data Recorder**

DATA PROCESSING APPLICATION AND OPTION MODULES

Type 8403-X	BK Connect Data Processing
Type 8403-A-X	BK Connect Data Processing (advanced)
Type 8405-B-X	BK Connect Advanced Frequency Analysis Option
Type 8405-C-X	BK Connect CPB Option
Type 8405-E-X	BK Connect Order Analysis Option
Type 8405-F-X	BK Connect Order Tracking Option
Type 8405-G-X	BK Connect Sound Quality Metrics Option

DATA RECORDING PACKS

Type 8402-NS	BK Connect Time Data Recorder Pack - node-
	locked licence that includes Types 8400, 8401 and

Type 8402-A-NS BK Connect Time Data Recorder Pack (advanced) -

node-locked licence that includes Types 8400,

8400-C, 8401, 8401-A and 8402

DATA PROCESSING PACKS

BK Connect Data Processing Pack - node-locked Type 8403-NS

licence that includes Types 8400, 8401 and 8403

DATA RECORDING AND PROCESSING PACKS

BK Connect Data Processing and Time Data Type 8404-NS

Recorder Pack - node-locked licence that includes

Types 8400, 8401, 8402, 8403 and 8403-A

BK Connect Data Processing and Time Data Type 8404-A-NS

> Recorder Pack (advanced) - node-locked licence that includes Types 8400, 8400-A, 8400-B, 8401,

8401-A, 8402, 8403 and 8403-A

Team Data Sharing

Type 8400-T-FY BK Connect Team Server, Single User, Annual

Floating Lease Licence and Support

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Software Maintenance and Support Agreements[†]

Agreement for Type 8400

Agreement for Type 8400-A

Agreement for Type 8400-B

Agreement for Type 8400-C Agreement for Type 8400-D

Agreement for Type 8400-E

Agreement for Type 8400-F

Agreement for Type 8401-A

Agreement for Type 8401-V

Agreement for Type 8402

Agreement for Type 8403

Agreement for Type 8403-A

Agreement for Type 8405-B

Agreement for Type 8405-C

Agreement for Type 8405-E

Agreement for Type 8405-F

Agreement for Type 8405-G Agreement for Type 8402-NS Pack

Agreement for Type 8402-A-NS Pack

Agreement for Type 8404-A-NS Pack

Agreement for Type 8403-NS Pack

Agreement for Type 8402-NS Pack

Agreement for Type 8401

M1-8400-X

M1-8400-A-X

M1-8400-B-X

M1-8400-C-X

M1-8400-D-X M1-8400-E-X

M1-8400-F-X

M1-8401-A-X M1-8401-V-X

M1-8401-X

M1-8402-X

M1-8403-X

M1-8403-A-X

M1-8405-B-X

M1-8405-C-X

M1-8405-F-X

M1-8405-F-X

M1-8405-G-X

M1-8402-NS M1-8402-A-NS

M1-8403-NS

M1-8402-NS

M1-8404-A-NS

To learn more about all HBK offerings, please visit hbkworld.com

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[&]quot;X" indicates the licence model can either be N: Node-locked or F: Floating

Agreement expiration date to be agreed at time of contract