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Experion LX HMI Specifications
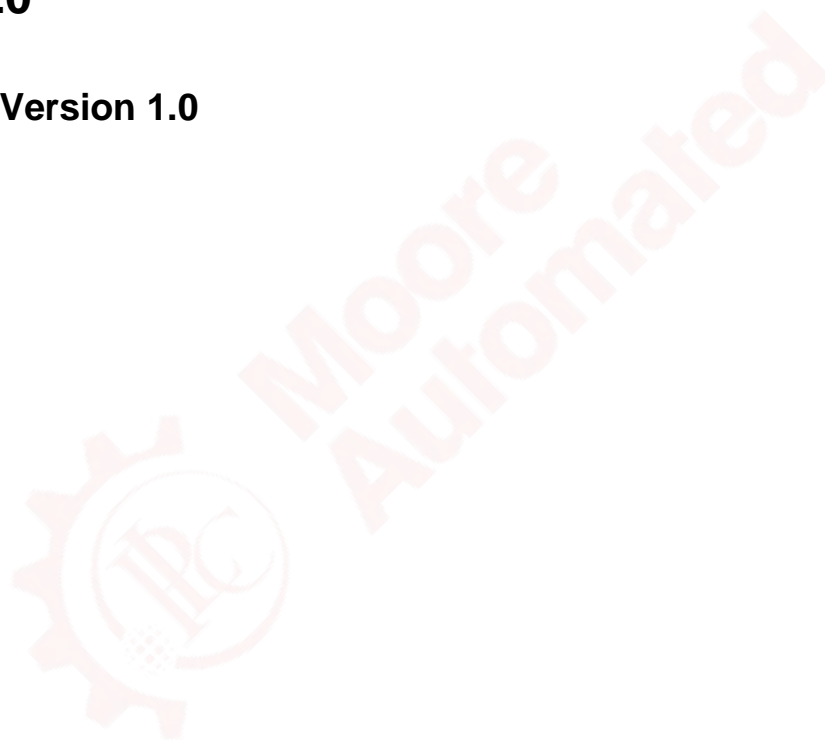
LX03-200-520

Release 520
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1.   Introduction

1.1.   Experion LX System

The Experion LX is Honeywell's unified control system for process, business, and asset management that helps industrial manufacturers increase their profitability and productivity and accessibility to local support without sacrificing quality and reliability in an increasingly competitive environment. Experion takes customers beyond distributed control system (DCS) functionality with an advanced automation platform solution and innovative application integration to improve business performance and peace of mind.

As a member of Honeywell's Experion family, Experion LX is designed to fit the varied application needs of customers across verticals through integrating state-of-the-art technology from the award-winning Experion Process Knowledge System (PKS) with innovative design of Series 8 I/O modules and cabinets. Validated wider range of COTS options, easier engineering and maintenance capabilities, and integrator-friendly programs and tools help Experion LX to provide lower total cost of ownership for customers.

1.2.   Architecture Overview
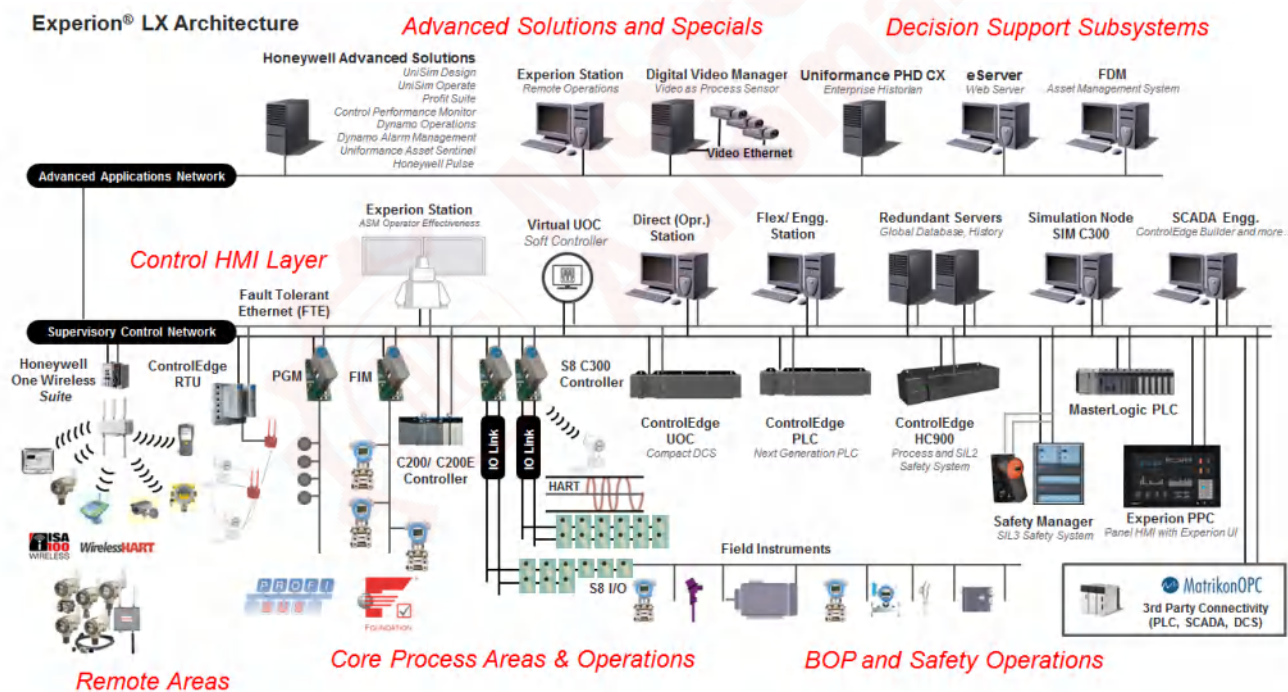
The Experion LX system comprises several different integrated hardware and software solutions depending upon the needs of the application. The architecture above represents a subset of the possible nodes and controllers. Note that Experion LX architecture is highly scalable and not all nodes and controllers shown here are necessary or required.

1.3. Experion HMI Overview

The Experion LX HMI consists of an optionally redundant set of servers where each server or redundant server pair supports a number of connected Stations. Such Experion LX systems can be integrated with other Experion systems using Experion Distributed System Architecture (DSA).

Experion LX R520 supports major enhancements listed below (as compared with R511)-

- UOC enhancements- CAB, UIO HART diagnostics in Experion, OPC UA DA Server support

- Windows OS and SQL update (Windows 10 2019 LTSC, Windows Server 2019, SWL Server 2019)

- Batch Production Execution modules (Formula Sets, Campaign Manager, Electronic Work Instruction)

- Native Experion Batch reporting feature

- OPC UA HA Server and MQTT interface support

1.4. Experion LX Station

The Experion LX Station is the human-machine interface (HMI) that can be used for different functions around a process, plant or mill including operations, monitoring, maintenance, and engineering.

There are two types of Experion LX Station available to satisfy a broad range of architecture needs. A mix of Experion Station types can be implemented to provide the most appropriate, site-specific solution possible.

Both Experion LX Station types use the same operator interface and other features for consistent operation regardless of type. This also means that configuration is simplified as custom displays, trend sets, etc. are configured once and then available across the various types of Experion LX Stations. All types host the Configuration Studio Experion engineering tool. Each Experion Station type has additional functionality as described in the following tables.

Experion LX Station – Flex	
Description	Experion LX Flex Station is a versatile operator interface that uses an efficient caching mechanism to present process data to the operator. It is suitable for full-time operations and can also be used as engineering or wireless Stations
Details	LX Flex Stations can be configured with a static or rotary connection. The static connection provides a permanent, dedicated link. The rotary connection provides an "as required" connection, enabling numerous casual users to access the Experion LX system as needed, which is advantageous from a licensing point of view. For example when 5 Station connections are configured, 5 connections can be established at one time but the software could be installed and be available for use by many more than 5 individuals.

Experion LX Station – Direct	
Description	Experion LX Direct Station provides direct access to process data, alarms and events from control sources such as Series 8 C300 controller, UOC, C200/C200E, Fieldbus Interface Modules (FIM), and IO Link Interface Modules (IOLIM). This provides a high-availability operations platform for critical processes.
Details	- The LX Direct Station connected to the Experion Server for communication to SCADA and DSA point sources, system history, the system event journal, and the system configuration file server. - The LX Direct Station supports the implementation of a "logical console". This allows operators to fully respond to all alarms/events within their scope of responsibility regardless of operator actions on other consoles; providing a single work space for an operator for event handling, alarm acknowledgement, alarm silencing, display manipulation and other functions

1.5.   Experion LX Server

A server or redundant server combination functions as a system-wide historian and global database. The Experion Server also supports communication to SCADA point sources, DSA point sources, OPC clients/servers and holds the system event journal, system configuration files, custom applications and server scripts. The server is the source for data, alarms, events, etc. for the client-connected applications and the Experion LX Station–Flex. One or more Experion Servers are required for an Experion LX System.

Experion LX Server can also be used as an operator or an engineering station. For redundant Experion LX Server system it is recommended to use the backup Server as the engineering station.

2. Experion LX Specifications

2.1. Database and Station Sizing

Limits shown here apply to the number of Station supported for a single Experion LX Server. Multiple Experion LX Servers can be combined into a single operational system using DSA.

Items per Experion LX Server	Standard Capacity System	High Capacity System	Comments
Number of Flex Stations	5	15	
Number of Direct Stations	10	15	
Total Server Points	13,000	1,67,000	Sum of Process, SCADA, Equipment, DSA and non-CEE points
Number of Process Points	8,000	10,000	Any device that uses the Control Data Access (CDA) interface consumes process points, like S8 C300
Number of SCADA Points	4,000	50,000	Any points that are used to display data retrieved from SCADA Interfaces are classified as SCADA points. Examples of these devices include the Modbus TCP/IP, DNP3 Protocol Interface
Number of Analog Points (UOC)	8,000	10,000	For ControlEdge UOC using the Control Data Access (CDA). This limit includes total Analog points, Digital points, and Composite device points. Please refer LX03-370 UOC Specifications for detailed point definitions.
Number of Digital Points (UOC)			
Number of Composite Device Points (UOC)			Also in a mixed controller environment (S8 C300, UOC, C200/C200E), Experion LX can have maximum 8,000 and 10,000 process/UOC points respectively for Standard and high capacity system in any combination.
Number of Equipment Points	1,000	2,000	Other points and hardware items built as part of the equipment still contribute to their own relevant capacity constraints.

Number of DSA Points	0	1,00,000	DSA Points are created whenever a point that belongs to another server is accessed using DSA. DSA Points are not licensed on the server that is subscribing to the points.
Number of non-CEE Points	0	5,000	Total Non-CEE Points Published from SM to C300 Controller
System-wide Equipment Points	5,000	10,000	If a server is subscribing to other servers via DSA, the total of all remote equipment and local equipment points cannot exceed this number.
PSA (Point Server) Points	No overall limit		The PSA point count is an aggregation of points from point server interfaces such as SPS/Adv OPC /BMA etc. Each interface may have its own limits but the overall PSA count will count against the total point count limit for a server
EFM Meters	2,000	2,000	Used to collect and export custody transfer data. An EFM meter uses one SCADA point license.
SCADA Point Algorithms	50,000	50,000	Algorithm blocks can be linked to SCADA points
Maximum number of C300 controller per Server	50	50	
Maximum number of SCADA channels	20	99	Channels typically represent a physical connection to a device, such as a device connected to one port of a terminal server. A channel can support more than one Remote Terminal Unit (RTU).
Maximum number of SCADA controllers	50	999	This is the maximum number of RTUs for a given server. It is spread across all channels and includes OPC RTUs to support the OPC client interface

Maximum number of User Defined Scanned Parameters per Analog or Status SCADA Point2	200	200	Analog or Status type user defined scanned parameters (UDSP) may be added to Analog and Status SCADA Points in any combination up to a combined total of 200 UDSP per point. Alarming on user defined scanned parameters is not supported.
Maximum number of scanned parameters per server	100,000	100,000	This includes fixed scanned parameters (such as PV, SP, OP, A1 – A4), user defined scanned parameters (UDSP), and any parameters configured with a 0 second or DEMAND scan period
Maximum pps from all configured SCADA devices	Limited by device	Limited by device	

2.2.   Alarm, Event, Alert, Message Lists

Items	Specification	Comments
Maximum number of active alarms	4,000	Every alarm and event that occurs is saved in the online event database for a configurable period.
Maximum number of active messages	1,000	Number of messages that appear in the Message summary. Messages can be generated to provide additional information to an operator; for example, when a point goes into alarm, a message can provide an explanatory note or a procedure.
Maximum number of SOE messages	32,767	Number of SOE messages that can appear in the SOE summary.
Maximum number of events in online event file	1.2 million	• All alarms, login actions, operator actions, and configuration changes are logged in the online event file. • Up to two events are generated for every alarm, including one event for entering the alarm condition and one for return to normal.
Maximum number of Printer connections	20	This is the total number of printers that can be configured as either report or alarm devices

2.3. Station Display Sizing and Performance

Station Display Performance Specifications	Specification
Display Parameters	
Number of dynamic parameters per display	700 or fewer
Number of dynamic parameters currently in view on a pan and zoom display [1]	700 or fewer
Maximum number of dynamic parameters on an overview display [2]	2,000
Number of parameters per second (pps) per Station computer [3]	1000/sec
Number of dynamic parameters per Station computer	1,200 or fewer
Display Updates	
Maximum Display Update Rate [4]	1 second
Typical field change to display update time with 600 or less parameters per display	< 2 seconds
Typical complex display call up time with 300 or less parameters [5,6]	< 1.5 seconds
Typical complex display call up time with 600 or less parameters [5,6]	< 2 seconds
Standard Faceplate Call Up Time	< 2 seconds
Equipment Display	
Maximum number of Equipment Summary Display tables expanded simultaneously in a cluster	50
Maximum number of System Status Dashboard shapes per Dashboard	48
Note 1 – A single overview display with a maximum size of 2000 dynamic parameters is supported if the High Capacity platform is used	
Note 2 – A single overview display with a maximum size of 2000 dynamic parameters is supported if the performance platform is used	
Note 3 – When more than 1,200 dynamic parameters are configured, the update rate must be greater than 1 sec. to not violate max pps	
Note 4 – The recommended continuous display update rate is 4 seconds.	
Note 5 – Call up time depends on display complexity: specification is based on a non-complex custom display using standard HMIWeb Display Builder objects with limited use of scripts. This excludes the first initial call up and is based on a client node running a single instance of Station.	
Note 6 – Complex displays are defined by the number of data bound objects identified, large amount of total objects on the display, and some amount of scripting.	

2.4. Enterprise Model Sizing

2.4.1. Assets

Items	Specification	Comments
Assets	1,000	The asset model represents the organization of items in the enterprise, for example, process units, individual pieces of equipment or facilities, etc. The relationship or hierarchy between assets and entities forms the asset model. The primary relationship in the asset model is that of asset containment, where one asset contains another.
Assignable assets	1,000	Assignable assets provide a way to assign assets to an operator's scope of responsibility. An assigned asset includes all asset children of the assigned asset including any points associated with those assets or any alarm groups that have been designated by that asset for scope of responsibility purposes. The number of assignable assets is a subset of the total number of assets. Only 500 for Standard Capacity System
Nesting depth for asset hierarchies	10	
Children per asset	No Limit	These totals are still subject to the overall maximum number of events per second and maximum burst of events limit that the Experion LX Servers can support.

2.4.2. Alarm Groups

Items	Specifications	Comments
Alarm groups	1000	Alarm Groups present alarm state/status for a disparate group of points and assets that are not represented by a single asset in the asset model. Only 500 for Standard Capacity System
Children per alarm group	500	
Nesting depth for alarm group hierarchies	5	
Maximum number of system alarm groups defined in a system	200	

2.5. Station Multi-Window Functionality

Multi-window functionality is a purchased option for the Experion LX Flex Station and is standard for the Experion LX Direct Station. A multi-window Station uses SafeView to manage the placement of its windows.

Specification	Specification
Number of monitors	Up to 4
Number of windows [1]	Up to 16
Number of concurrent faceplates	Up to 8
Note 1 – Number of windows includes faceplates, custom displays, Experion System displays etc. For backward compatibility reasons, the multi-window option for ES-F supports the configuration of multiple instances of Station (Multiple Static Station Option) as an alternative to a multi-window implementation.	

2.6. Station Trends

Item	Specification	Comments
Trend pens per set	32	Trends can be preconfigured or configured online as necessary by browsing the database and selecting the desired point and parameter
Trend periods	1, 5, 20 minutes 1, 2, 4, 8, 12 hours 1, 2, 5 days, 1, 2, 4 weeks 3, 6 months, 1 year	Any of the standard history collection intervals may be used as the basis for the real-time and historical trends.
Number of operating groups	16,000	
Points per operating group	8	Each group has three standard views available including faceplate, group trend (with control parameters accessible) and numeric trend.
Number of Trend Sets	3000	Per Experion LX Server
Trends on custom displays performance specifications		
Item	**Specification**	
On a Single Display		
Maximum number of full trends [1]	1	
Maximum number of basic trends [2]	4	

On a Single Station	
Maximum number of trends	8
Maximum number of pens across all trends	64
Across all Stations	
Maximum number of trends	28
Maximum number of pens across all trends	224

Note 1 – A Limit Trend object with default view settings corresponds to a Basic Trend for the purpose of these capacity constraints. If any additional view options are enabled a Limit Trend object corresponds to a full trend.

Note 2 – A basic trend is a much simpler object that only includes the plot area and axes. It is recommended to use the basic trend when adding more than one trend object to a single display

2.7.   History Sizing

2.7.1.   Collection Rates

Items	Specifications	Comments
Standard history	• Predefined collection rates of 1, 2, 5, 10 and 30 minutes • 3 additional user defined collection rates can be defined.	• When you configure a point parameter for standard history collection, Experion also collects 4 different standard history averages, based on the standard history snapshot rate that you choose for standard history collection. • The default standard history snapshot rate is 1 minute and the collection rates for averages are 6-minute, 1-hour, 8-hour and 24-hour averages. • The averages are calculated using the 1-minute base interval. That is, 6-minute averages are calculated on six 1-minute values. If you change the 1-minute base interval the averages are still calculated from the base interval. For example, if you change the base interval to 30 seconds, 6-minute averages are calculated on twelve 30-second values.
Fast history	• Predefined collection rates of 5, 10, 15, 20 and 30 seconds. • 3 additional user defined collection rates can be defined.	• A maximum of 8 collection rates can be defined choosing from the default intervals on the left • Additional rates can be defined; however they must be in multiples of the base rates. • The 5 second base rate can be configured to 1 second. The 5 second default collection rate for Fast History can be changed to 1 second, and the 1 minute collection for Standard History can be changed to 30 seconds if necessary. Note, however, that changing the collection rates in this way can place an additional load on the process control network.
Average (based on Standard History rates)	• Predefined collection rates of 6, 60, 480 and 1440 minutes	• A maximum of 4 collection rates can be defined

2.8.   Server Data Acquisition Performance

Items	Standard Capacity System	High Capacity System	Comments
Experion LX Controllers			
Maximum parameters per second (pps) from all controllers on FTE	3,700	4,700	This includes data access to all CDA devices such as C200, C200Es, S8 C300, UOC, PGMs, FIM, IOLIM, and Simulation environment.
Maximum number of CDA subscribed parameters from all controllers on FTE	8,000	25,000	This is the number of parameters that can be actively subscribed by a server at any one time. The Experion adds and removes items from the subscription list based on demand.
DSA			
Maximum pps from each configured DSA subscribing server	0	1,000	This information is duplicated in section 2.16, DSA.
SCADA			
Maximum pps from all configured SCADA devices	Limited by device		
OPC			
Maximum OPC pps from all configured OPC servers	See section 2.18, OPC		

2.9. Notification Performance

Items	Specification	Comments
Maximum number of events (burst condition)	1,500	The Experion LX Server alarm system will handle an event burst of up to 1,500 events, with a minimum time between consecutive bursts. An "event burst" is defined as a group of events greater than 40/sec, received from all connected event servers in a period of less than 3 seconds.
Formula to calculate the time period required between consecutive bursts, to allow for event processing	$\Delta T = BS/(60-ER)$ Where: ΔT = # of seconds required between bursts BS = Burst Size (number of events in the burst) ER = Event Rate between bursts	Examples: • 1,500 event burst and no events between bursts: ΔT = 1,500/60 = 25 seconds 500 event burst with 30 events/sec between: ΔT = 500/30 = 17 seconds
Maximum number of sustained alarms/second [1]	30/sec	
Maximum number of sustained events/second [1]	10,000/Hour	With peaks of up to 40/sec
Maximum duration of events in online events file	12 weeks	
Maximum number of events in online events database	1.2 million	All alarms, login actions, operator actions, and configuration changes are logged in the online event file. Up to two events are generated for every alarm, including one event for entering the alarm condition and one for return to normal. Event archiving can be used to access older events. Approximately 60 MB of hard disk space is required for every 100,000 events archived.
Maximum number of alerts/second	1	
Maximum burst of alerts	100	These totals are still subject to the overall maximum number of events per second and maximum burst of events limit that the Experion Servers can support.

Note 1 – The Experion LX Server includes the option to support OPC alarms and events in addition to native Experion LX notifications. When the Experion LX Server is configured to receive alarms and events from an OPC alarm and event server, the notification limits noted in this table are applicable to the combined set of events received from all connected event sources.

2.10. Supervisory Control and Data Acquisition (SCADA)

2.10.1. Terminal Servers

The SCADA controller or RTU connection to the Experion Server depends on several factors, including the plant's layout, the type of interface used and the controller's communication port(s). For those using a serial interface, controllers can be directly connected to the server's serial ports but would typically only be used on small systems. For larger systems, more serial ports can be added through the use of a Terminal or Device server.

Terminal Servers also provide a means of connecting serial port SCADA controllers to redundant Experion Servers. They can be deployed on network topologies using single Ethernet, and dual Ethernet, (two subnets. There can be single or dual connections to controllers, (when supported). A dual connection would require two Terminal Servers and be configured as a redundant SCADA channel in Experion.

Items	Qualified Devices
Terminal Servers	• Systech NDS/5000 Series Network Device servers: Built for industrial requirements, these RJ45 based terminal servers come in a range of 8 and 16 port models, all with a built in 3 port Ethernet switch as well as rack mount versions. • Systech NDS/6000 Series Network Device servers: Built for industrial requirements, these DB9 based terminal servers come in a range of 2, 4 and 8 port models, some with a built in 4 port Ethernet switch and some rack mountable.
Note 1 – The above Terminal Servers are tested to reconnect ports under the different planned and unplanned fail over scenarios.	

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