

DeltaV™ PK Flex Controller

- Easy Engineering with Software-Scalable Capacity
- Simple Project Sizing with Flex DST
- Reduce Project Cost with Subscription-Based Licensing
- Increased Affordability for Future Updates



The DeltaV™ PK Flex Controller is a Software-scalable controller with flexible subscription-based licensing

Introduction

The DeltaV™ PK Flex Controller provides a feature-packed control solution for all types and sizes of applications. It is designed to operate as part of a DeltaV system (not as a standalone controller) and functions in combination with other nodes in the system.

PK Flex Controller provides the same powerful functionality as other controllers in the system but with the added advantage of flexible capacity and a subscription-based license that will help reduce the upfront cost of capital investments. This is because users subscribe only to what is needed and can add functionality any time.

Benefits

Easy Engineering with Software Scalable Capacity:

With the PK Flex Controller, there is no need for exact or time-intensive engineering. That's because users do not need to determine the Device Signal Tags (DST) capacity of their controller at the beginning of the project. They can increase capacity by simply adding software subscription-based licenses. Projects can start with as little as 50 DSTs in the controller. If the project changes and more I/O is needed, users can simply add licenses, up to a maximum of 1500 DSTs per PK Flex Controller.

Simple Project Sizing with Flex DST:

Traditionally, DST counting requires knowledge of the I/O type (AI, AO, DI and DO types) that will be configured to determine the DST license. PK Flex Controller introduces a new way of counting capacity with Flex DSTs, where there is not a need to know the I/O type, but only the amount of I/O. This simplifies the engineering and planning of the capacity of a project.

Reduce Project Cost with Subscription-Based License:

Businesses can significantly reduce project capital costs by transitioning to a subscription-based license that allows them to pay over time for controller functionality instead of paying upfront. This is a superior alternative when capital investment is tight and there is high uncertainty in the duration and scope of the project. Subscription-based licensing provides a financial incentive and reduces that uncertainty by shifting the cost to be an operational expense. Subscription-based licensing allows annual payments for the duration of the operation of the system, and because the process is at full production, it accelerates the return on the investment.

Also, the PK Flex Controller reduces the cost by allowing you to pay only what you need—when you need it—by making all the functionality selectable. Businesses can start with certain functionality and if more functionality is needed at a later date and over time, users can simply add more licenses to the same hardware platform. This enables businesses to start small pilot projects with the PK Flex Controller and later scale up production in that same system, reducing project costs by eliminating the need to purchase new controllers with new functionality.

Increased Affordability for Future Hardware Updates:

With subscription-based licenses, businesses can purchase the controller hardware at a reduced price. Now, it's more affordable to change controllers more often (every three or five years) to stay up to date with latest CPU and memory, and keep the system evergreen, running new functionality with the confidence that newer controllers will support it.

Lower Cost of Ownership: Another benefit of the PK Flex is that as part of the subscription, it includes Hardware Warranty for the controller. This means that if any of your PK Flex assemblies fail during its usable life (15 years from the original factory shipping date), a replacement or repaired assembly will be provided at no additional cost. This provides you with the peace of mind that you have a better management of the lifecycle of your controllers and a lower total cost of ownership.

Easy Redundancy: The DeltaV PK Flex Controller supports 1:1 redundancy for increased availability. Simply install the redundant controller onto the carrier next to the primary – no added cabinet space or configuration changes.

Flexibility in I/O: The following DeltaV I/O may be used with the DeltaV PK Flex Controller: M-Series Series 1 & Series 2 traditional^{1,2}, S-Series traditional with the use of the M-series to S-series I/O Interface Carrier Adapter³, CHARMs I/O (CIOCs), and Wireless I/O (WIOCs), enabling you to select the I/O family that best meets your needs.

Integrated Safety: The DeltaV PK Flex Controller can use either of the DeltaV SIS products, including DeltaV SIS with Electronic Marshalling, or the DeltaV SLS 1508 Safety Logic Solver. Both offer unique benefits and are easily scalable.

Easily Connect Third Party Devices: Third party devices such variable speed drives and Ethernet based transmitters are easily connected using the native on-board protocols, without the use of a dedicated Ethernet or I/O card. For protocols not supported natively on the PK Flex Controller, the DeltaV Virtual IO Module 2 (VIM2) can be used as well as any of the traditional DeltaV Bussed cards.

Speed: The DeltaV PK Flex Controller executes control modules as fast as 25ms when using simplex High Density cards, enabling control of faster process applications.

Advanced Software: The PK Flex Controller supports all of the advanced DeltaV features that are expected in a world class Distributed Control System:

- DeltaV Class-based control and unit-modules
- DeltaV Model Predictive Control
- DeltaV Neural Networks
- Works with DeltaV Batch Executive
- Works with DeltaV Version Control Audit Trail (VCAT)

Product Description

The DeltaV PK Flex Controller executes control logic based on the process signals derived from the I/O and Ethernet Device subsystems.

Control modules are automatically scheduled by the controller, based on their assigned scan rates. This allows each control function to be optimized based on the process dynamics.

¹ M-Series Intrinsically Safe traditional cards are not supported for use with the PK Flex Controller.

² M-Series 8-wide I/O Interface Carriers manufactured prior to 2002 are not compatible with PK Flex Controller. Contact your local sales representative for additional information.

³ M-Series Vertical Plus I/O Interface Carriers are compatible with the PK Flex Controller when using the M-series to S-series I/O Interface Carrier Adapter. Contact your local sales representative for additional information on installation and setup.

Modules scan times can be set as fast as 25ms, and as slow as 60 seconds. The number of control modules that can be assigned to a controller depends on the complexity and scan rate of each modules. For the fastest loop execution time, use the supported High Density cards in a simplex configuration.

Each controller node can be installed as a simplex or redundant node. Redundancy is provided by adding a second controller, mounted adjacent to the primary controller. Controllers may be connected to DeltaV traditional I/O carriers, which are mounted to the right of the controller carrier. Up to 8 carriers with 8 cards each can be connected to the local bus I/O, for a total of 64 traditional I/O cards. 4-wide I/O carriers may be used in combination with 8-wide I/O carriers2, and in this case, the maximum of 8 total I/O carriers is retained.

In addition to traditional I/O cards, the local bus supports fieldbus technologies, including FOUNDATION Fieldbus, DeviceNet, and Profibus DP, as well as Serial interface cards. These various I/O products provide a wide range of interfaces to meet the needs of your control application. The DeltaV PK Flex Controller also supports CHARMs and WirelessHART I/O cards.

A DeltaV PK Flex Controller can communicate with up to 16 CIOCs, each providing up to 96 individually configurable signal types (Limited to the Flex DST capacity enabled in the DeltaV PK Flex Controller). The WirelessHART I/O card (WIOC) provides redundant communication for up to 100 WirelessHART devices, providing high availability and reliability of wireless data. DeltaV PK Flex Controller can communicate with up to 16 WIOCs.

The DeltaV PK Flex Controller is designed for harsh environments and is rated for G3 corrosive environments, with an operating temperature range from -40 to 60°C. It is ideally suited for remote installation close to the process equipment. For more traditional installations with central marshalling cabinets, the PK Flex Controller can utilize any DeltaV I/O solution, including Electronic Marshalling and traditional I/O, meaning it has the flexibility to be installed where the application requires.

Capacity

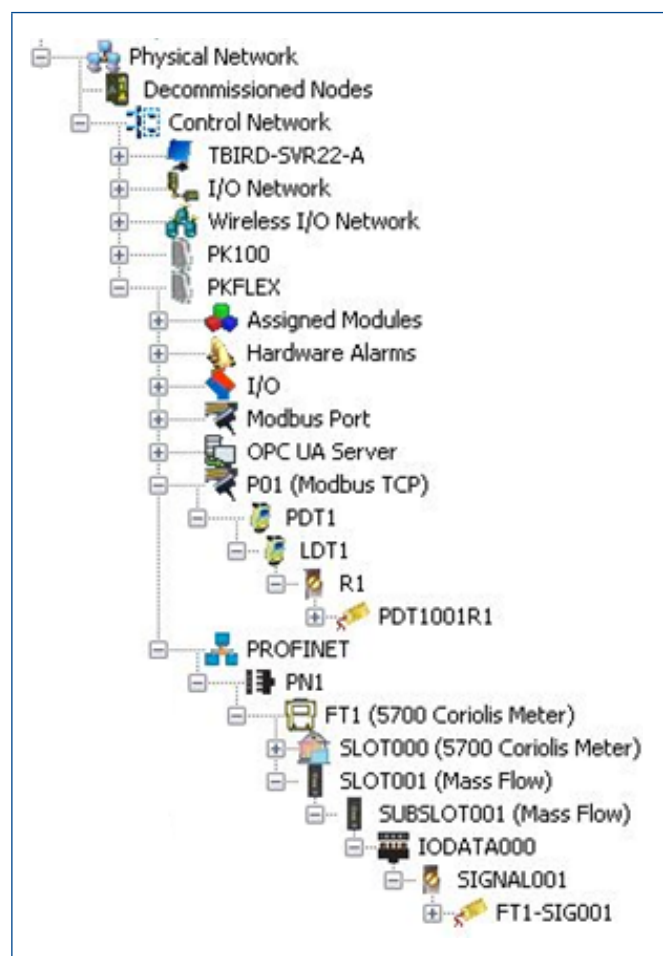
The DeltaV PK Flex Controller is configured like any other controller in a DeltaV system and can be installed as simplex or redundant node. It can be used for applications in a wide variety of sizes, from 50 to 1500 Flex DSTs, depending on which

capacity you subscribe to. For Ethernet Device Control, The DeltaV PK Flex Controller can be used for a variety of Ethernet Devices, supporting Modbus TCP client or EtherNet/IP interface in port P01 and PROFINET(PN1). P01 and PROFINET (PN1) can be enabled at the same time for greater functionality.

DeltaV PK Flex Controller maximum capacity is:

Sizing	Max# Flex DST's	Max # Ethernet Devices in port P01	Max # of Devices in PROFINET port PN1
PK Flex Controller	1500	128	250

*Consult DeltaV engineering guide for performance with maximum capacities



PK Flex Controller subsystems that includes port P01 that can be enabled as EtherNet/IP interface or Modbus TCP client and a PROFINET port PN1.

How Subscription Works

PK Flex is only available to Product Support subscribers. PK Flex Controller hardware is available for purchase in both simplex and redundant configurations. Controller hardware that is purchased by a customer will be owned by the customer.

PK Flex Controller software is licensed on a subscription basis that provides flexibility in the length of the term (license terms are available in 1-, 3-, and 5-year terms) and controller-specific parameters. Specifically, PK Flex Controller software license pricing and enabled functionality are dependent upon the below parameters, which the customer may specify:

- **Flex DST** – the quantity of I/O needed per PK Flex Controller. There is no need to distinguish between the type of I/O (AI, AO, DI and DO). You can start as low as 50 and go up to 1500 DSTs per controller.
- **Controller Redundancy** – whether the PK Flex Controller is used in a redundant configuration.
- **Protocol Licens** – the protocol you want to enable in the controller: OPC UA server, Modbus TCP server, Modbus TCP client, EtherNet/IP interface or PROFINET controller.
- **Ethernet Device License** – the number of Devices (PDTs) that you will need to configure in P01 and PN1.

The expiration date of the licensing can be found in the system licensing summary. Customers will get reminded via email to renew subscription.

If a PK Flex Controller software license is allowed to expire, the continued use of the software is not permitted. The PK Flex Controller software will continue running the currently-loaded configuration in this unlicensed state but you will not be able to download any changed configuration to the unlicensed PK Flex Controller.

Once you select the license term and controller-specific parameters that are applicable to your application, you will receive a bundle of authorization keys that you can load in your DeltaV system to enable the selected functionality. Remember that you can add more functionality (e.g., increased I/O) during your subscription, and you will be sent a new authorization key that will be synchronized with the duration of the selected license term.

Please contact your sales representative to know more about the subscription contract process.

Also remember to size your ProfessionalPLUS station appropriately to the total amount of DST (regular and Flex DSTs) in the system. The DeltaV system still has a limit 30K DSTs that all could be Flex DSTs or could be a combined with regular DST to a maximum of 30K.

PK Flex Controller Supported as Part of a DeltaV System in Combination with Other Controllers

The DeltaV PK Flex Controller can only be used as part of a DeltaV system (not supported as Standalone controller) starting with v15.FP1 and can be combined with other controllers in the same system. Providing total flexibility in combining subscription-based license nodes and perpetual licenses nodes in the same system.

Supported/Embedded Protocols

OPC UA

The OPC UA Server in the PK Flex Controller provides native server implementation of a Data Access profile (real-time data) compliant with OPC UA version 1.02. The OPC UA server will allow up to 5,000 reads/second and 500 writes/second.

Modbus TCP

The PK Flex Controller supports Modbus TCP Client and Server interfaces. The Modbus TCP Server interface allows the PK Flex Controller to talk to Modbus Client devices like HMIs for monitoring purposes.

Available in P01, The Modbus TCP Client interface will support Modbus data sources such as PLCs, MCCs, analyzers and similar devices communicating Modbus TCP. In this interface the PK Flex Controller is a Modbus Client reading and writing data from/to Modbus Server devices. The Modbus server devices can be Modbus TCP devices or Modbus serial devices using a Modbus TCP gateway.

The Modbus TCP interface supports the following types of data access:

- Reading input data from Modbus Coils, Discrete Input, Holding Registers, and Input Registers.
- Writing output data to Coils and Holding registers.

All reads will be performed periodically and outputs will be sent when they are written.

EtherNet/IP

The EtherNet/IP protocol allows data sources such as PLCs, Intelligent Field Devices (IFDs), variable-speed drives, MCCs, and analyzers as well as other devices communicating EtherNet/IP to connect directly in to DeltaV via the PK Flex Controller.

The EtherNet/IP interface will support connections for both implicit and explicit messaging to allow access to both Class 1 and Class 3 EtherNet/IP I/O adapters. Redundancy with EtherNet/IP Class 1 Implicit and Class 3 Explicit messaging for control (sending outputs to the device) require special considerations due to exclusive owner communications defined by the protocol. Please refer to the DeltaV System Planning Guide for more information. Class 3 PCCC and UCMM with Logix tags message classes are also supported.

PROFINET

PROFINET is a communication protocol designed to exchange data between controllers and devices in an industrial automation network. PK Flex Controller is a PROFINET controller and will connect with up to 250 devices, such as Drives, Remote I/O, transmitters, and valves.

PROFINET in the PK Flex Controller is compliant with version 2.3 and CC-A functionality. Allowing configuration via GSDML files and configuring name and IP address for devices from DeltaV Explorer. It supports connectivity to real time cyclic data coming from the devices to use in control studio for process control applications (acyclic data and IRT data are not supported).

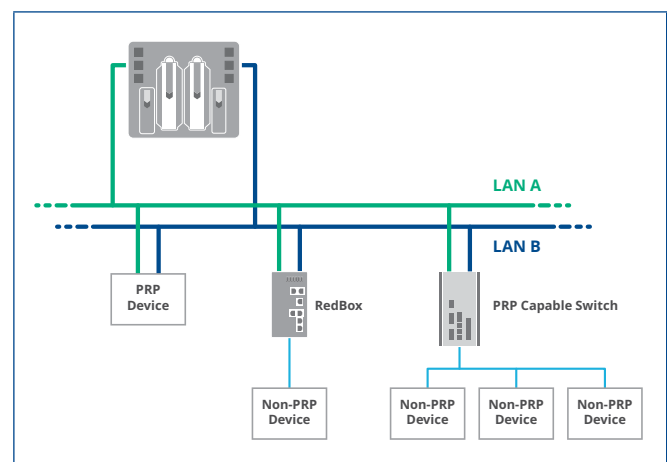
For better trouble shooting, device diagnostics are displayed in DeltaV Diagnostics, and are available for mapping into control studio for alarming or historization.

With the recent adoption of Advance Physical Layer (APL) in the process control industry. The PK Controller can be used with Ethernet-APL Devices, APL switches and PROFINET for greater connectivity. In addition to that, PROFINET includes the support of Process Automation Profiles for easy configuration and commissioning of APL devices by removing the need of using vendor specific GSDML files. This makes the PK controller the perfect platform for use in this emerging technology.

Parallel Redundancy Protocol (PRP)

Parallel Redundant Protocol (PRP) PRP is a network protocol standard for Ethernet that provides seamless failover against failure of any network component. Therefore, it is a great solution when high availability and short switchover time is required. PRP allows for communications in Primary and Secondary ports of the Ethernet Device Network in the PK Flex Controller. This means that a device connected to the Ethernet Device network is getting the same information at the same time, through different network paths. In case of failure in one of the networks it basically provides a zero-time to recovery (no time to switchover) and eliminates any single point of failure in a redundant Ethernet Device Network.

PK Flex Controller with Parallel Redundant Protocol (PRP) enabled in a redundant Ethernet Device Network, talking directly with native PRP devices and using a RedBox to talk to Non-native PRP devices.

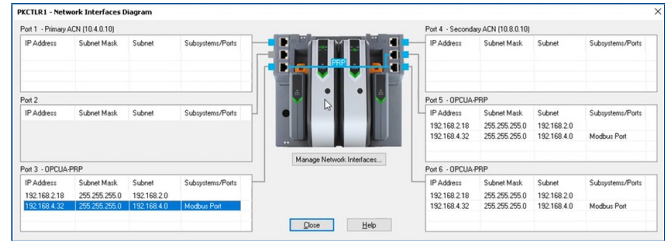


PK Flex Controller with Parallel Redundant Protocol (PRP) enabled in a redundant Ethernet Device Network, talking directly with native PRP devices and using a RedBox to talk to Non-native PRP devices.

PRP is independent of the application-protocol and can be used by most Industrial Ethernet protocols. In the PK Flex Controller, PRP is an optional feature that can be enabled at the Ethernet Device Network level and is available with all the protocol clients supported in the PK Flex Controller. When enabled, PRP runs on top of the protocol that is selected at that time. For PRP to work properly, the Ethernet Devices connected to the redundant network needs to support PRP natively as well. If the devices do not support PRP natively, then a RedBox must be used to allow the connection into the PRP network without having bad status in diagnostics.

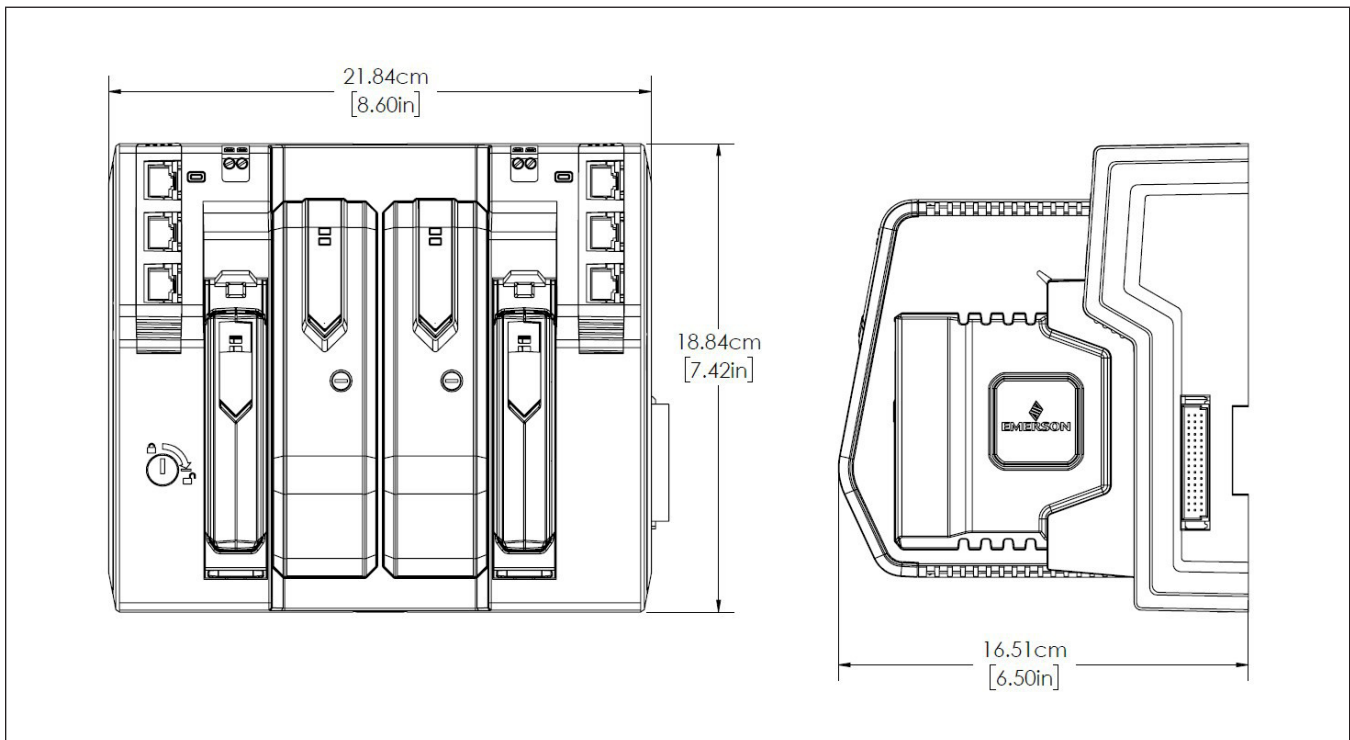
Advance Networking

With advance networking in the PK Flex Controller, now is easier than ever to setup the IP addresses for all the different network configurations used in the Ethernet ports. Now in one place you can change set up IP Address, define the default gateway, enable PRP, or bond ports to participate in an MRP ring topology.



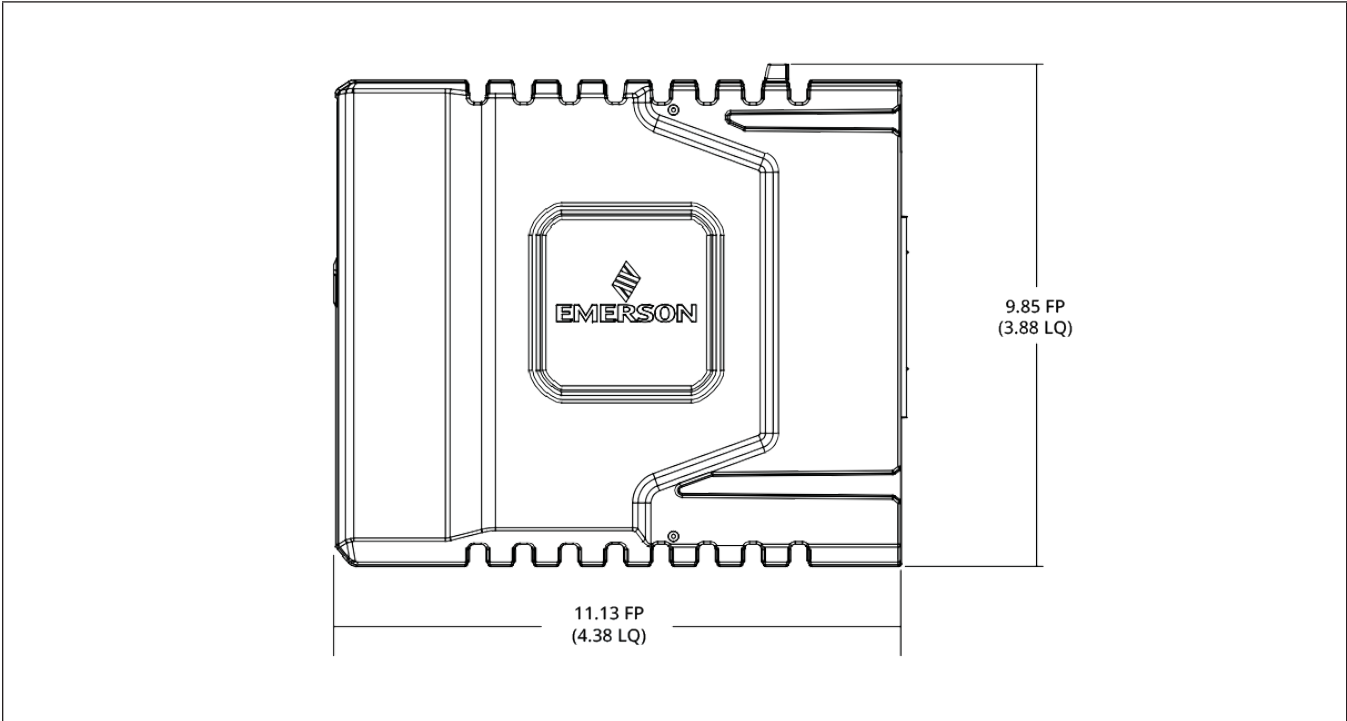
Network Interface Diagram allows you to see the network configuration for all your Ethernet ports in the PK Flex Controller.

Hardware Specifications



Dimensioned Drawing of Redundant DeltaV PK Flex Controller with Carrier and Power Modules.

PK Flex Controller Power Module Dimensions



PK Flex Controller Power Module Dimensions.

PK Flex Controller Specifications

Item	Specification
Input power requirement through the PK Flex Controller carrier	+24 VDC \pm 10% at 350 mA maximum; 700 mA maximum for redundant
Externally applied backup power for real-time clock	+5.0 to +12.6 VDC at 15 uA typical for a simplex controller. Double the consumption for redundant PK Flex Controllers
Power Dissipation	7.5 W simplex; 15 W redundant
Isolation	None. All circuits are referenced to the +24 VDC return

PK Flex Controller Carrier Specifications

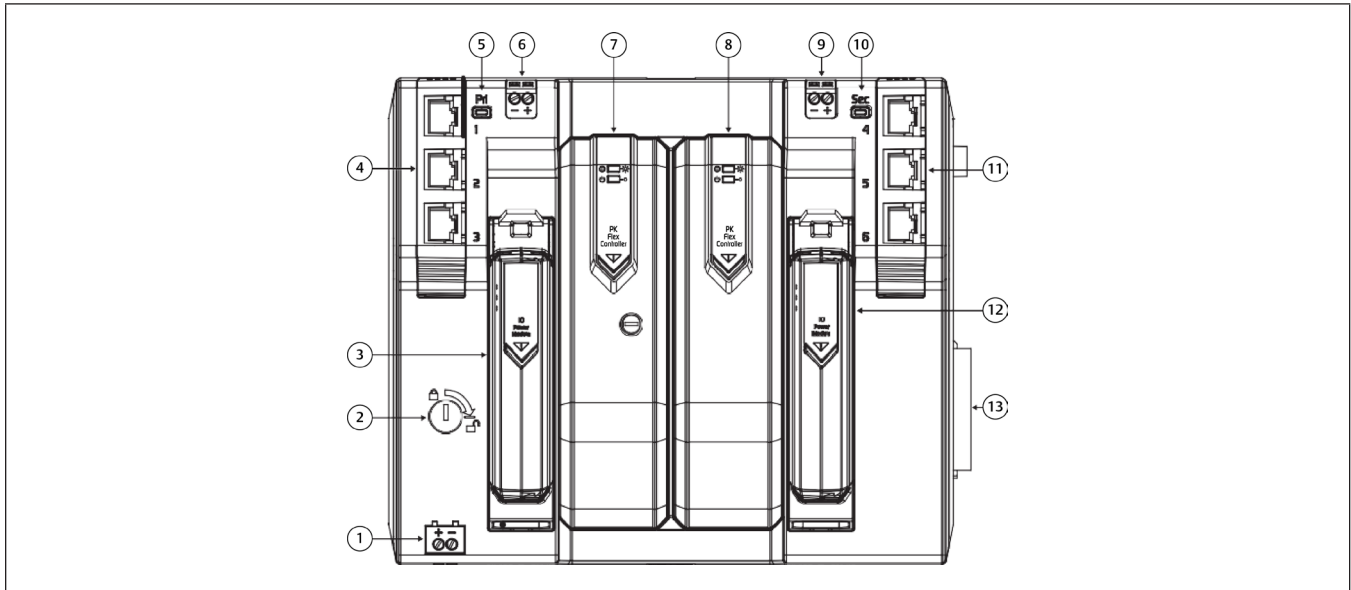
Item	Specification
Capacity	Two PK Flex Controllers
Input Power (redundant)	+24 VDC \pm 10% at 2.75 A maximum
Output Power to I/O Card Carrier(s)*	+12.25 VDC at 3.0 A maximum*
Redundant Ethernet Connections (six)	Copper twisted pair: 10/100BASE-TX with RJ45 connectors; full duplex operation
Ethernet Port Power Requirement, each (provided by controller)	+5.0 VDC at 200 mA maximum; carrier supports +5.0 VDC at 300 mA maximum
Mounting	Upright on a horizontal DIN rail

*For systems that require additional power (more than the power modules supply), use one of our recommended methods for injecting power into the I/O card carrier. See DeltaV M-Series I/O Subsystem Horizontal Carriers PDS for more information.

PK Flex Controller Power Module Specifications

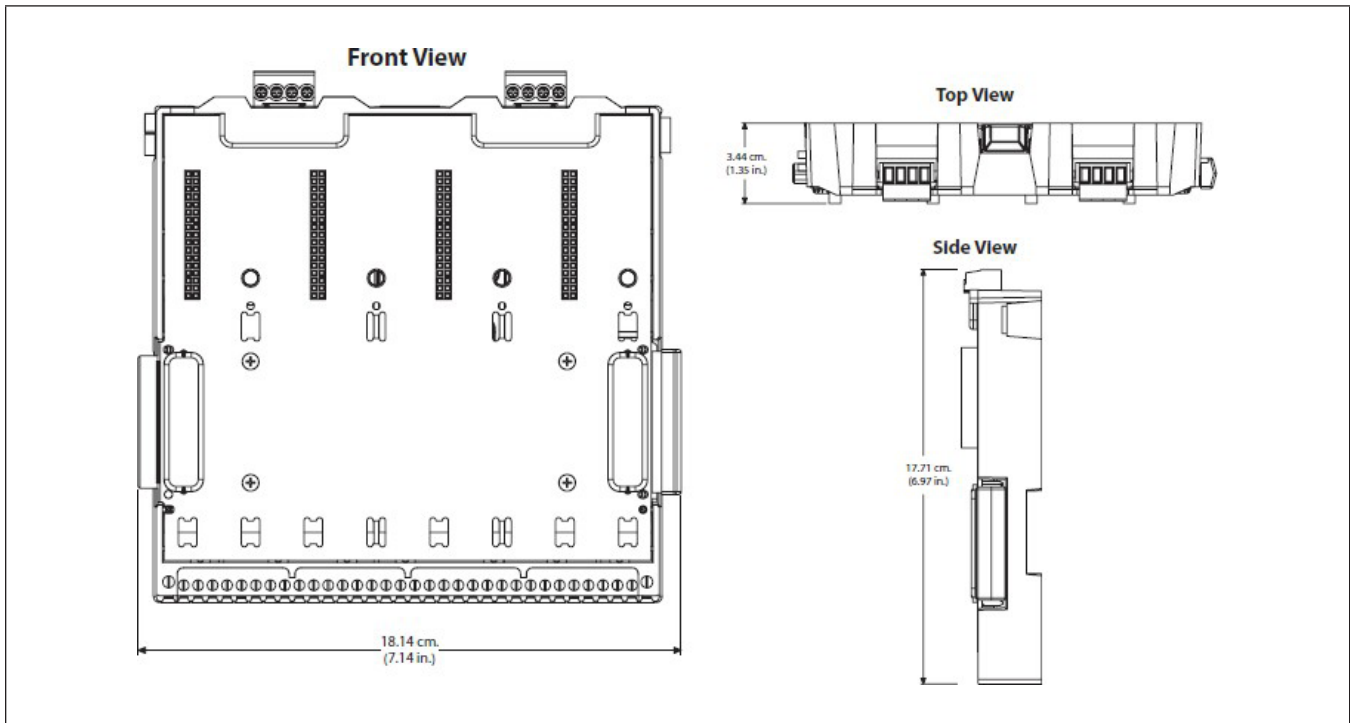
Item	Specification
Input Power (redundant)	+24 VDC \pm 10% at 2.75 A maximum
Output Power	+12.25 VDC at 3.0 A maximum
Power Dissipation	3.25 W

PK Flex Controller Carrier Parts



Callout	Description
①	Screw terminals for backup battery connection.
②	Physical key switch When the switch is in the locked position, the KeyLockStatus parameter of the controller has a value of TRUE and you cannot download, decommission, upgrade or Telnet to the PK Flex Controller. When locked, you can commission and authenticate the PK Flex Controller.
③	Redundant Power Module Provides power to connected I/O.
④	Ethernet ports 1-3. These appear in software as Network Portx. The three RJ45 connectors on the primary ports are connections for separate networks. These have an electrically isolated shield for each port. The Faraday shield for each RJ45 connector has no DC ground connection (floats) and only used to extend the shield onto the electronics around the Ethernet circuitry.
⑤	Pushbutton release for Ethernet ports 1-3
⑥	Screw terminals for primary power
⑦	Redundant PK Flex Controller
⑧	Redundant PK Flex Controller
⑨	Screw terminals for secondary power
⑩	Pushbutton release for Ethernet ports 4-6
⑪	Ethernet ports 4-6. These appear in software as Network Portx. The three RJ45 connectors on the secondary ports are connections for separate networks. These have an electrically isolated Faraday shield for each port. The Faraday shield for each RJ45 connector has no DC ground connection (floats) and only is used to extend onto the electronics around the Ethernet circuitry.
⑫	Redundant Power Module Provides power to connected I/O
⑬	Carrier connector

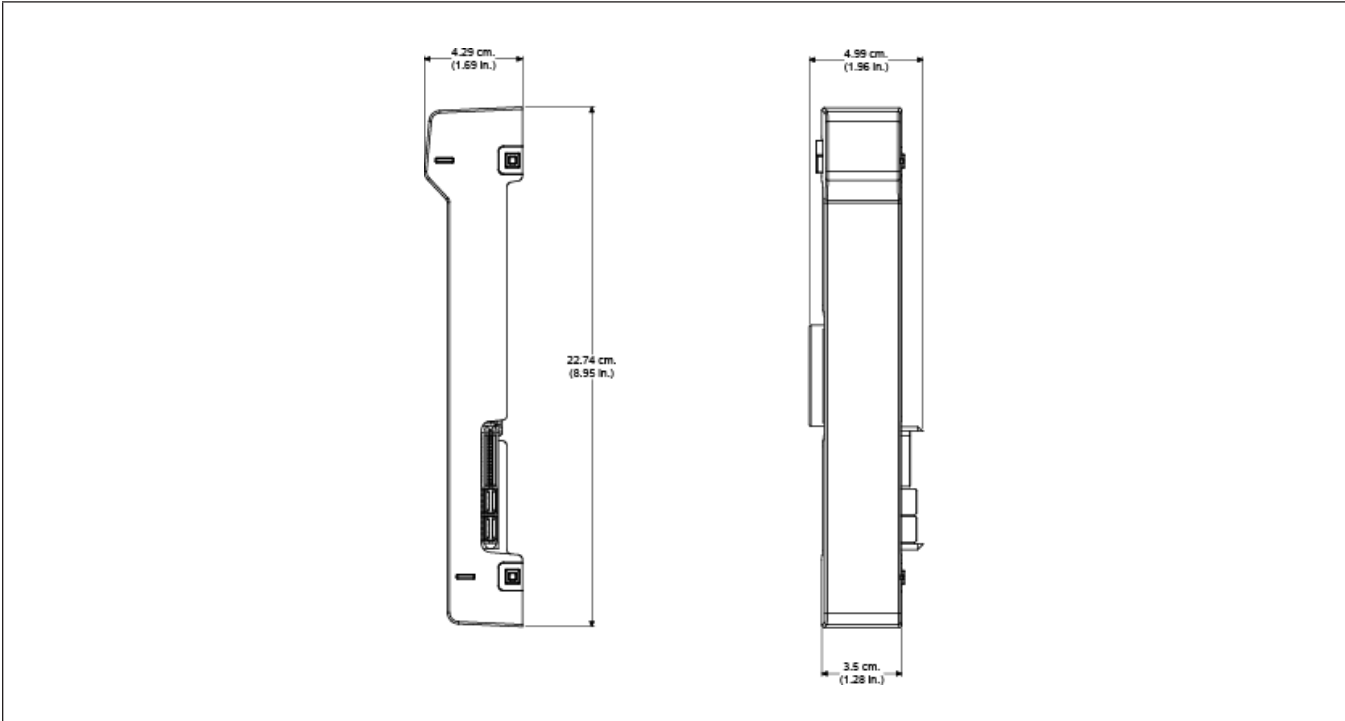
4-wide Horizontal I/O Interface Carrier Dimensions



4-wide I/O Carrier Specifications

Item	Specification
Capacity	Four I/O cards with terminal blocks.
Maximum Current	Bussed field power bus (per I/O card): 3.2 A at 30 VDC or 250 VAC for each connection.
LocalBus Cable Lengths	0.87m (2.8ft) 1.2m (3.9ft) (standard) 1.53m (5.0ft)

M-series to S-series I/O Interface Carrier Adapter



M-series to S-series I/O Interface Carrier Adapter Specifications

Item	Specification
Maximum Current	LocalBus (Powers IO cards): 8A

Certifications

The following certifications are available for the DeltaV PK Flex Controller:

- **CE**
EMC-EN 61326-1
- **FM**
FM 3600
FM 3610
FM 3611
FM 3810, Jan 2005
- **CSA**
CAN/CSA C22.2 No.213
CAN/CSA C22.2 No. 61010-1
- **ATEX**
EN 60079-0
EN 60079-15
- **Marine Certifications:** IACS E10
ABS Certificate of Design Assessment
DNV GL Type Approval Certificate
- **Security Certifications**
Achilles Level 2 (v14.FP1)*

Hazardous Area/Location

The following standards are available for the DeltaV PK Flex Controller:

- **FM (USA)**
Installation: Class 1, Division 2, Groups A, B, C, D, T4
- **cFM (Canada)**
Installation: Class 1, Division 2, Groups A, B, C, D, T4
- **ATEX**
[Ex] II 3 G Ex nA IIC Gc
- **IEC Ex**
Installation: Ex nA IIC T4 Gc

For installation instructions, please refer to: DeltaV Scalable Process System Zone 2 Installation Instructions.

Specifications for the DeltaV PK Flex Controller	
DST Limit	1500
Module Execution Rates	25ms, 50ms, 100ms, 200ms, 500ms, 1s, 2s, 5s, 10s, 30s, 60s
User Memory	Controller memory
Input Power Required	+24 VDC ±10% at 2.75 A maximum
Protocols Supported	Protocols Supported Natively on the PK Flex Controller: Modbus TCP (Server & Client), Ethernet/IP (Client: Class 1 & Class 3), PROFINET controller (real time acyclic data) and OPC UA Server (real time data). Non-native protocols available through dedicated Bussed cards or the DeltaV Virtual I/O Module 2 (VIM2).

*PRP communications are not included in the certification.

Environmental Specifications	
Operating Temperature	-40° to 60°C (-40° to 140°F)
Storage Temperature	-40° to 85°C (-40° to 185°F)
Relative Humidity	5 to 95%, non-condensing
Protection Rating	IP20, NEMA 12
Airborne Contaminants	ISA-S71.04-1985 Airborne Contaminants Class G3 Conformal Coating
Shock (Normal Operating Conditions)	10g ½-sine wave for 11ms
Vibration (Operative Limit)	1mm peak-to-peak from 5Hz to 13.2Hz, 0.7g from 13.2Hz to 150Hz
LED Indicators ¹	
Power – Green V	Indicates DC power is available
Error – Red Continuous	Indicates an internal error condition
Error – Red Flashing	Indicates the controller is decommissioned
Active – Green	Indicates the controller is operating as the primary controller
Active – Green Flashing	Indicates the active controller is not configured or a download is in progress
Standby – Green	Indicates the controller is operating as the backup controller
Standby – Green Flashing	Indicates the standby controller is not configured or a download from the active is in progress

¹For additional information refer to DeltaV Books Online.

Protocol Specifications of the PK Flex Controller	
Modbus TCP (Server)	<ul style="list-style-type: none"> ■ Modbus TCP protocol as specified by www.modbus.org. ■ PK Flex Controller as a Server reads and writes data from and to Modbus Client devices. ■ Supports 8 connections. ■ Uses MODICON (PLC) based addressing (Modbus absolute addressing is not supported). ■ To enable you need to add the Flex Modbus TCP Server Interface subscription-based license. No other license is required, and it does not consume Flex DSTs. <p><small>*Please review the VIM2 product data sheet as an alternative to provide added Modbus TCP functionality (e.g. Modbus RTU, Modbus ASCII, etc.)</small></p>
Modbus TCP (Client) ¹	<ul style="list-style-type: none"> ■ Modbus TCP protocol as specified by www.modbus.org except for a limited amount of register types, it only allows 9999 of each category. ■ Register addresses are limited in the following ranges: <ul style="list-style-type: none"> ● Coils: 1 – 9999 ● Discrete Inputs: 10001 – 19999 ● Input Registers: 30001 – 39999 ● Holding Registers: 40001 – 49999 ■ PK Flex Controller as the Modbus Client reads and writes data from and to Modbus Server devices. ■ Uses MODICON (PLC) based addressing (Modbus absolute addressing is not supported). ■ Available in port P01 subsystem. To enable you need to add the Flex Modbus TCP Client Interface subscription-based license and add Flex Ethernet Connected I/O subscription-based license for each device connected in port P01. Then one Flex DSTs will be consumed for every LDT that is configured. <p><small>*Please review the VIM2 product data sheet as an alternative to provide added Modbus TCP functionality (e.g. Modbus RTU, Modbus ASCII, etc.)</small></p>
EtherNet/IP Interface ¹	<ul style="list-style-type: none"> ■ EtherNet/IP interface in the PK Flex Controller is a Scanner Device (Client) that reads and writes data from EtherNet/IP Adapter devices (Servers). ■ Ethernet/IP interface supports the following types of messaging connections: <ul style="list-style-type: none"> ● Implicit messages (Class 1) ● Explicit messages (Class 3) ● Class 3 with PCCC ● UCMM with Logix Tags ■ Configuration of this messages connections is only supported via manual configuration on the DeltaV Explorer at the LDT level or bulk edit configuration. EDS files are not supported. ■ Available in port P01 subsystem. To enable you need the Flex EtherNet/IP Interface subscription-based license and add Flex Ethernet Connected I/O subscription-based license for each device connected in port P01. Then one Flex DSTs will be consumed for every LDT that is configured. <p><small>*Please review the VIM2 product data sheet as an alternative to provide added EtherNet/IP functionality (e.g. EDS file support.)</small></p>

<p>OPC UA Server</p>	<ul style="list-style-type: none"> ■ PK Flex Controller is a Server and allows reads and writes from OPC UA Clients. ■ Supports up to 6 client connections. ■ Allows up to 5000 reads/sec and 500 writes/sec. ■ Supports only the DA profile (real time data). ■ Is based on OPC UA standard version 1.02 that supports the following: <ul style="list-style-type: none"> ● OPC Binary Transportation ● 128 or 256-bit encryption levels ● Message Signing ● Digital Certificates – Self Signed and Certificate Authority (CA) ● Support online browsing ■ To enable you need the Flex OPC UA Server Interface subscription-based license. No other license is required, and it does not consume Flex DSTs. <p><small>*Please review the DeltaV OPC UA product data sheet for more information regarding other OPC UA clients and servers available in DeltaV</small></p>
<p>PROFINET Controller</p>	<ul style="list-style-type: none"> ■ Compliant with PROFINET version 2.3 and CC-A. ■ Configuration using GSDML files. ■ DCP operations. Discovery and basic Configuration Protocol allow us to discover, identify, and configure PROFINET device name and IP address using DeltaV Engineering tools. ■ Support reading and writing to Real time cyclic data and reading Device Diagnostics. ■ Does not support Real time Acyclic data and Isochronous Real Time Data (IRT). ■ Maximum of 250 devices. ■ When configuring and commissioning Ethernet-APL devices, Process Automation profiles are supported but expanded diagnostics and drop-in device replacement for a shared profile are not supported. ■ Participates in an MRP ring with bonding ports but cannot be MRP manager. ■ The use of PRP is not supported with PROFINET. ■ Supports only S1 devices. That means that when using redundant controller there will be a bump during a controller switchover due reconnection time with devices after switchover (This is per definition of S1 devices in PROFINET standard). ■ AMS Device Manager is not supported natively through the PK Flex Controller. Consult AMS Device Manager product data sheet for connectivity with PROFINET. ■ To enable you need the Flex PROFINET Interface subscription-based license and add Flex Ethernet Connected I/O subscription-based license for each device connected in the PN1 network. The consumption of Flex DSTs will happen in the following way: <ul style="list-style-type: none"> ● If device has 1 or 2 Physical Slots (or Modules) defined in the GSDML file (most common in small devices like Motor starters & transmitters): <ul style="list-style-type: none"> - 1 Flex DST for the first 16 values. - After the first 16 values we charge on Flex DST for every signal. ● If device has more than 2 Physical Slots (or Modules) defined in the GSDML file (most common in large devices like Remote I/O & PLCs): <ul style="list-style-type: none"> - All inputs and outputs are counted and charged with a Flex DST. <p><small>*Please review DeltaV Engineering guide for communication and redundancy performance of PROFINET</small></p>

¹The PK Flex Controller can natively support running either the Modbus TCP Client or the EtherNet/IP Scanner interface but not both simultaneously. The Modbus TCP Server and OPC UA Server can be run simultaneously alongside one of the chosen protocol Clients in P01 and PROFINET.

HW Warranty Description for PK Flex

PK Flex Hardware Warranty provide replacement parts during the usable life of the controller (15 years from the original factory shipping date) and as long as it is under a valid subscription contract.

Further description and general conditions of the HW warranty include:

- The Hardware Warranty provides replacement of an enrolled controller failed assemblies with new or repaired Emerson factory assemblies, at no additional cost, and replacement assemblies are warranted for one year if you do not have an active subscription, if you have an active subscription the replacement assemblies will continue to be covered under the original subscription agreement.
- The Hardware Warranty provides replacement modules for PK Flex Controllers that are in a lifecycle status of Current, Active or Supported, and the where original factory shipment date does not exceed 15 years.
- PK Flex Hardware Warranty is included as part of the Flex DST subscription, and it requires no additional purchase. Therefore, its renewal and expiration are dependent of the subscription terms. The following parts are the only ones covered under the PK Flex subscription agreement:
 - PK Flex Controller (KL2002X1-BE1)
 - Power Module for PK Controller Carrier (KL1502X1-BA1)
 - I/O Port Switch Module; Copper; for PK Controller Carrier (KL1605X1-BA1)
 - PK Controller Carrier (KL4002X1-BA1)
- Emerson will ship replacement assemblies within one regular business day following completion of the return authorization request process.
- PK Flex Hardware Warranty does not include any other DeltaV or third-party products or services. Please consult the DeltaV Extended Hardware Warranty program product data sheet if you want coverage in other Emerson products.
- Replacement assemblies will be provided on an exchange basis only.
- Hardware Warranty is intended for failed item replacement only. It is not for purposes of updating, repairing, checkout, re-configuring, calibrating or cleaning of PK Flex hardware.

- For a covered system with assemblies in a Retired lifecycle status, a drop-in replacement for a failed Retired assembly will be provided if available. However, if a drop-in replacement is not available, the failed Retired assembly is not covered by the service.
- In hardware redundancy situations, and where a newer drop- in replacement is available for a failed Retired assembly, the Hardware Warranty does not cover replacement of the second (functional) assembly.
- Technical Support and Onsite services are available at an additional cost to provide fault isolation, removal or installation of spares, software reinstallation, etc.
- If customers or OEM are using an SI dongle and have not enter a subscription contract, the PK Flex controller only will be covered under the standard Hardware warranty period of 12 months from initial installation, but not greater than 18 months after shipment.
- The return process must adhere to the existing policies, including the DeltaV Hardware/Software Return Policy, and the DeltaV Hardware Return Policy covering Product Analysis, Invoicing, and Customer-Induced Damage.

Customer Responsibilities

In order to ensure the effectiveness and responsiveness of the PK Flex Hardware Warranty, the Customer will be expected to meet the following obligations:

- Identifying, removing, and re-installing an assembly within the system at their own expense.
- Properly packing failed assemblies to reasonably protect them from physical and electrostatic damage during return shipment.
- The return of faulty/defective parts under warranty is required per our DeltaV hardware warranty policy. All DeltaV faulty/defective parts replaced under Hardware Warranty must be returned to Emerson within 90 days after the MRT approval. Faulty/Defective parts under warranty that are not returned within 90 days after the MRT approval will be invoiced at the full list price of the replacement, in addition to freight and handling cost. Invoicing will be to the company referenced on the Purchase Order.

- Failed assemblies returned to Emerson that have been mechanically damaged, modified without authorization, immersed in liquid, corroded, damaged by fire, or are otherwise unsuitable for reconditioning are subject to rejection. Emerson will invoice the Customer for any rejected assembly at the existing spare assembly price.
- For systems where previous Hardware Warranty has been expired for more than 90 days, a site audit and signed Warranty Reinstatement form is required.

Hardware Ordering Information

Description	Model Number
Simplex PK Flex Controller Assembly (includes 1 PK Flex Controller, 1 Carrier, 2 IOPs, 1 Power Module, 1 PK Controller Protection Cover, and 1 Power Module Protection Cover)	PKFLEXS
Redundant PK Flex Controller Assembly (includes 2 PK Flex Controllers, 1 Carrier, 2 IOPs, and 2 Power Modules)	PKFLEXR

*Converting a PK Flex Hardware into a regular PK controller or the other way around is not possible. Also, combining a regular PK with a PK Flex in the same carrier for redundancy is not supported.

Subscription-Based Licensing Ordering Information

Description	Model Number
Flex DST w-Year Subscription for use with PK Flex Controller Hardware; xxxx Flex DSTs	VEFLEXDSTSwSxxxx_YyFYzz
Flex Ethernet Connected I/O w-Year Subscription for use with PK Flex Controller Hardware; Physical Device	VE4109FLEXSwSnnn_YyFYzz
Flex OPC UA Server Interface w-Year Subscription for use with PK Flex Controller Hardware; 1 Interface License	VE4111FLEXSwS01_YyFYzz
Flex MODBUS TCP Server Interface w-Year Subscription for use with PK Flex Controller Hardware; 1 Interface License	VE4110FLEXSwS01_YyFYzz
Flex MODBUS TCP Client (P01) Interface w-Year Subscription for use with PK Flex Controller Hardware; 1 Interface License	VE4101FLEXSwS01_YyFYzz
Flex EtherNet/IP (P01) Interface w-Year Subscription for use with PK Flex Controller Hardware; 1 Interface License	VE4100FLEXSwS01_YyFYzz
Flex PROFINET Interface w-Year Subscription for use with PK Flex Controller Hardware; 1 Interface License	VE4108FLEXSwS01_YyFYzz
Flex Controller Redundancy w-Year Subscription for use with PK Flex Controller Hardware; 1 Controller Redundancy License for 1 Redundant Pair of PK Flex Controllers	VE31REDFLEXSwS01_YyFYzz

These model numbers are for initial subscriptions only; model numbers for renewals are listed separately in the price book.

*w represents the length of the subscription term in years (1, 3, or 5)

*y represents the specific year of the subscription term (1, 2, 3, 4, or 5)

*zz represents a two-digit indicator of the year of purchase (e.g. 23)

*xxxx represent the bundle size for Flex DSTs (50, 100, 200, 500 or 1500)

*nnn represent the bundle size for Flex Ethernet Connected I/O (1, 5, 10, 20, 50, 100 or 500)

PK Flex Controller Spare Part Ordering Information

Description	Model Number
PK Flex Controller	KL2002X1-BE1
PK Controller Protection Cover	KL4002X1-DA1
Power Module; for PK Controller Carrier	KL1502X1-BA1
Power Module Protection Cover; for PK Controller Carrier	KL1502X1-BB1
I/O Port Switch Module; Copper; for PK Controller Carrier	KL1605X1-BA1
PK Controller Carrier	KL4002X1-BA1

Related Products

- DeltaV M-Series Traditional I/O
- DeltaV S-Series Traditional I/O
- DeltaV M-Series I/O Subsystem Horizontal Carriers
- S-Series Horizontal Carriers
- M-series Virtual I/O Module 2
- S-series Virtual I/O Module 2
- DeltaV PK Controller
- DeltaV OPC UA servers and clients
- ProfessionalPLUS Station Software suite
- DeltaV Distributed Control System Product Support
- DeltaV Extended Hardware Warranty Service

Prerequisites

- PK Flex is only available to Product Support subscribers.
- For each DeltaV PK Flex Controller (or pair of redundant controllers), a PK Controller carrier is required.
- Each PK Flex Controller requires a dedicated system bulk power supply. Please refer to DeltaV Bulk Power Supplies product data sheet for details.
- The DeltaV PK Flex Controller requires v15.FP1 or later DeltaV software.
- ProfessionalPLUS workstation software license (VE2101Sxxxx-1) or ProfessionalPLUS Premium workstation software license (VE2101PSxxxx) needs to be sized appropriately to the total amount of DTS (regular and Flex DST) in the DeltaV system.

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