Honeywell

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Honeywell UDC Integration Reference

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EPDOC-XX63-en-431A	431	0	February 2015

Disclaimer

Contents

Planning considerations for installing and configuring Honeywell UDC controllers

This reference describes how to set up, configure, and test Universal Digital Controllers (UDCs).

Revision history

Revision	Date	Description
A	February 2015	Initial release of document.

How to use this guide

Complete each step before commencing the next step.

Step	Go to
Connect the UDC to the server	Architectures for Honeywell UDC
Set the communication parameters in the UDC	Communication settings for Honeywell UDC
Use Quick Builder to define channels	• Honeywell UDC channel and controller reference • "Build channels" topic in the *Quick Builder User's Guide*
Use Quick Builder to define controllers	• Honeywell UDC channel and controller reference • "Build controllers" topic in the *Quick Builder User's Guide*
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Devices supported by the Honeywell UDC interface

The server supports the following UDC models:

- UDC 3000
- UDC 5000
- UDC 6000

The server communicates with a UDC using RS-485 protocol. To use this protocol, the UDC must be fitted with the RS-485 communications option. Some models, manufactured prior to 1989, were not fitted with this option. For existing UDCs, we recommend that you upgrade to the latest firmware revision.

Attention
Not all UDCs have the same features, support is for the superset of these features.

Other documentation for Honeywell UDC

The following UDC documents are relevant for configuring the UDC:

- *UDC 3000 Product Manual* (51-52-25-07)
- *UDC 5000 Product Manual* (51-51-25-17)
- *UDC 6000 Process Controller Product Manual* (51-51-25-32)
- *UDC 3000/5000/6000 RS-422/485 Communications Option* (51-51-25-35)

The following documents for your server contain installation and configuration information:

- *Software Installation User's Guide*
- *Server and Client Configuration Guide*

Honeywell UDC-specific terms

Parameter acronyms Parameter acronyms are the server software names for the UDC parameters. They are an alternative to using the UDC parameter numbers.

Architectures for Honeywell UDC

The UDC communicates with the server over an RS-485 link. Consequently, the UDC must be fitted with the RS-485 communications option.

For details about RS-485 links, see the *Software Installation User's Guide*. (This describes how to install and configure qualified RS-485 interfaces, such as Stallion.)

Communication settings for Honeywell UDC

After connecting the UDC to the server, use the UDC's operator interface to configure the communication parameters.

- Communications options state (set to *rS-422*)
- Communication address for each loop (a unique number on the link from *1* to *99*)
- Baud (usually *9600*)
- Parity (*odd*)
- Duplex (*Half*)

The settings for Stop Bits (*1*) and Data Bits (*7*) are not configurable.

Attention
Record these values because you need them when using Quick Builder.

Honeywell UDC channel and controller reference

This section describes the configuration and addressing information specific to Honeywell UDC channels and controllers.

In addition to the information contained in this reference, and for help to build channels and controllers, see the section titled "Building controllers or channels" in the *Quick Builder User's Guide*.

Related topics

“Main properties for a Honeywell UDC channel” on page 12
“Port properties for a Honeywell UDC channel” on page 14
“Main properties for a Honeywell UDC controller” on page 16
“Optimizing Honeywell UDC scanning performance” on page 18
“Planning considerations for installing and configuring Honeywell UDC controllers” on page 5

Main properties for a Honeywell UDC channel

The Main tab defines the basic properties for a Honeywell UDC channel.

For information about how to create a channel, see the topic titled "Building controllers and channels" in the *Quick Builder User's Guide*.

Property	Description
Name	The unique name of the channel. A maximum of *10* alphanumeric characters (no spaces or double quotes). Note: In Station displays, underscore characters (_) appear as spaces.
Description	(Optional) A description of the channel. A maximum of *132* alphanumeric characters, including spaces.
Associated Asset	The Tag Name of the Asset to be associated with the alarm group.
Marginal Alarm Limit	The communications alarm marginal limit at which the channel is declared to be marginal. When this limit is reached, a high priority alarm is generated. To change the priority of the alarm system wide, see the topic titled "Configuring system alarm priorities" in the *Server and Client Configuration Guide*. To change the priority of the alarm for one channel, see the topic titled "About configuring custom system alarm priorities for an individual channel or controller" in the *Server and Client Configuration Guide*. A channel barometer monitors the total number of requests and the number of times the controller did not respond or response was incorrect. The barometer increments by two or more, depending on the error, and decrements for each good call. To calculate an acceptable marginal alarm limit, use the formula: Square root of the number of controllers on the channel × Marginal Alarm Limit defined on those controllers (Normally, you specify the same value for all controllers on a channel). For example, if there are 9 controllers on the channel and their Marginal Alarm Limit is set to *25*, the value would be *3* (which is the square root of 9) *x 25 = 75*.
Fail Alarm Limit	The communications alarm fail limit at which the channel is declared to have failed. When this barometer limit is reached, an urgent alarm is generated. To change the priority of the alarm system wide, see the topic titled "Configuring system alarm priorities" in the *Server and Client Configuration Guide*. To change the priority of the alarm for one channel, see the topic titled "About configuring custom system alarm priorities for an individual channel or controller" in the *Server and Client Configuration Guide*. Set this to double the value specified for the channel Marginal Alarm Limit.
Connect Timeout	The length of time that the server attempts to connect to the controller. The server will stop trying to connect to the controller once the timeout period passes. The default value *10* seconds. Use the default value unless the communications line has a high error rate, or unless you are using modems.
Read Timeout	The length of time that the server will wait for a reply from the controller. The server will stop waiting once the timeout period passes. The default value is *2* seconds. Use the default value unless the communications line has a high error rate, or unless you are using modems.
Item Type	The type of channel specified when this item was created.
Last Modified	The date and time the channel properties were modified.
Last Downloaded	The date and time the channel was last downloaded to the server.

Property	Description
Item Number	The unique item number currently assigned to this channel, in the format *CHNcc*, where *cc* is the channel number. You can change the item number if you need to match your current server database configuration. The number must be between *01* and the maximum number of channels allowed for your system. For more information about setting the maximum value, see the topic titled "Adjusting sizing of non-licensed items" in the *Supplementary Installation Tasks Guide*.

Port properties for a Honeywell UDC channel

The Port tab defines the communication-related properties for a channel. The properties vary according to the selected **Port Type**:

- *Serial*. Select this if you are using a Stallion EasyConnection adapter.
- *TerminalServer*. Select this if you want to connect the controller to the server via a LAN.

Attention
Set the port properties to the same values as those specified when configuring the controller.

Serial port properties

The serial port properties are applicable to a Stallion EasyConnection adapter.

Property	Description
Serial Port Name	The device name of the serial port.
Baud	The number of data bits per second. The default is *9600*.
Number of Data Bits	The number of data bits used for transmission. The default is *8*.
Stop Bits	The number of stop bits used for transmission The default is *1*.
Parity	Defines parity verification of each character and must match configuration on the end device. The default is *NONE*.
Checksum	The type of checksum error detection used for the port. Not applicable for this channel. Select *NONE*.
XON/XOFF	The type of XON/XOFF software flow control used to stop a receiver from being overrun with messages from a sender. The types are: • *Input* (use XON/XOFF to control the flow of data on the receive line) • *None* (default) • *Output* (use XON/XOFF to control the flow of data on the transmit line)
RS-232	Not applicable. (The RS-232 and RS-485 settings are mutually exclusive.)
RS-485	Select **Enable Stallion RS-485 Half Duplex** and **Echo**. (**Echo** indicates that the server expects messages it sends to the port on the transmit line to be echoed back on the receive line.)

Terminal Server port properties

Property	Description
Terminal Server TCP Host Name Terminal Server TCP Port No	The name and port number of terminal server to which the channel is connected. You can specify either a TCP host name or an IP address, but it must match the TCP host name used when you installed and internally configured the terminal server.
Idle Timeout	The time, in seconds, the channel waits for a successful connection to the server before closing the connection. A value of *0* indicates that the connection is never closed.

Property	Description
Checksum	The type of checksum error detection used for the port. Not applicable for this channel. Select *NONE*.

Main properties for a Honeywell UDC controller

The **Main** tab defines the basic properties for a Honeywell UDC controller.

For information about how to create a controller, see the topic titled "Building controllers and channels" in the *Quick Builder User's Guide*.

The server requires a controller definition for each loop in a UDC. You need to define one controller for each UDC 3000, and up to two controllers for a UDC 3300, UDC 5000, or UDC 6000 (these controllers can have two control loops).

Attention

When defining a UDC 3300, UDC 5000, or UDC 6000 controller, be sure to use an appropriate numbering scheme. For more information about numbering, see the topic titled "Loop address numbering."

Property	Description
Name	The unique name of the controller. A maximum of *10* alphanumeric characters (no spaces or double quotes). Note: In Station displays, underscore characters (_) appear as spaces.
Description	(Optional) A description of the controller. A maximum of *132* alphanumeric characters, including spaces.
Channel Name	The name of the channel on which the controller communicates with the server. (You must have already defined a channel for it to appear in this list.)
Marginal Alarm Limit	The communications alarm marginal limit at which the controller is declared to be marginal. When this limit is reached, a high priority alarm is generated. To change the priority of the alarm system wide, see the topic titled "Configuring system alarm priorities" in the *Server and Client Configuration Guide*. To change the priority of the alarm for one controller, see the topic titled "About configuring custom system alarm priorities for an individual channel or controller" in the *Server and Client Configuration Guide*. A controller barometer monitors the total number of requests and the number of times the controller did not respond or response was incorrect. The barometer increments by two or more, depending on the error, and decrements for each good call. The default value is *25*.
Fail Alarm Limit	The communications alarm fail limit at which the controller is declared to have failed. When this barometer limit is reached, an urgent alarm is generated. To change the priority of the alarm system wide, see the topic titled "Configuring system alarm priorities" in the *Server and Client Configuration Guide*. To change the priority of the alarm for one controller, see the topic titled "About configuring custom system alarm priorities for an individual channel or controller" in the *Server and Client Configuration Guide*. Set this to double the value specified for the controller Marginal Alarm Limit. The default is *50*.
Controller Type	The UDC type this controller represents: either 3000, 5000, or 6000.
Loop Address Other Loop Address	The UDC's loop address(es), as defined when setting up the UDC. For more information, see "UDC communications settings" and "Loop address numbering." If the UDC has only one loop, leave **Other Loop Address** blank.
Item Type	The type of controller specified when this item was created.
Last Modified	The date and time the controller properties were modified.
Last Downloaded	The date and time the controller was last downloaded to the server.

Property	Description
Item Number	The unique item number currently assigned to this controller, in the format *RTUnnnnn*. You can change the item number if you need to match your current server database configuration. The number must be between *01* and the maximum number of controllers allowed for your system. For more information about setting the maximum value, see the topic titled "Adjusting sizing of non-licensed items" in the *Supplementary Installation Tasks Guide*.

Loop address numbering

The server uses a separate controller to represent each of the two control loops in a single UDC 3300, UDC 5000, or UDC 6000.

The server sends a scan request to each controller consecutively by controller item number (loop number) in ascending order. Each UDC can only communicate a maximum of three times per second. If the two loops in a UDC have consecutive controller item numbers, up to 1/3 of a second can be wasted while the server waits for the UDC to accept a scan request for the second loop.

You avoid this problem, and spread the scan load efficiently, by interspersing loop numbering across UDCs so that the second loop in a particular controller is never scanned before the first loop has responded. The following figure shows optimal numbering for three UDCs, each with two control loops.

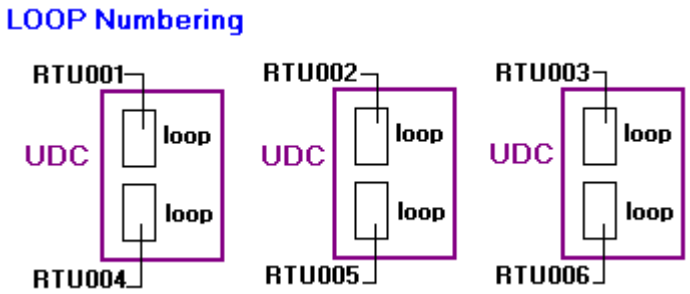


Figure 1: Loop address numbering

Related topics

“Change the order of loop addressing” on page 18

Optimizing Honeywell UDC scanning performance

Minimize the number of scan packets—and the burden on the server—by using a small number of available scan periods for all your point definitions.

Example scan periods:

- 5 seconds for fast changing, important parameters;
- 60 seconds for 1 minute PV history, parameters that change every few minutes
- 300 seconds for slow changing parameters

The scan packets that have been built can be listed by using the utility **lisscn** (list scan). Listing scan packets helps verify the scanning strategy.

For more information about **lisscn**, see the section titled "Command Reference" in the *Server and Client Configuration Guide*.

Honeywell UDC scan packets

When the **LOOP** parameter acronym is used as the UDC parameter value address, the **LOOP** parameter scans the PV, SP, OP, and MD value addresses in a single scan packet, thus optimizing scanning performance.

Two types of scan packets are created for UDCs:

- Periodic data acquisition
- Hardware diagnostic

A UDC can only process three scan packets per second. Therefore, never set the scan rate (scan period for the source address) to be faster than the UDC.

Change the order of loop addressing

Maximize processor response by ensuring that the controller item numbering is interspersed across several UDCs that have two loop addresses. For more information about loop address numbering, see the topic titled "Loop address numbering."

Related topics

“Loop address numbering” on page 17

Honeywell UDC points reference

This section describes how to configure points for a Honeywell UDC controller using Quick Builder.

In addition to the information contained in this reference, and for help to build points, see the section titled "Building and configuring points" in the *Quick Builder User's Guide*.

Related topics

“Defining a Honeywell UDC address for a point parameter” on page 20
“Planning considerations for installing and configuring Honeywell UDC controllers” on page 5

Defining a Honeywell UDC address for a point parameter

For **PV Source Address**, **Source Address**, and **Destination Address** the format for a UDC controller address is:

ControllerName Address

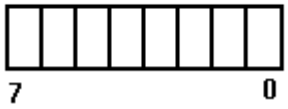
Part	Description
ControllerName	The name of the UDC controller.
Address	The address within the controller where the value is stored.

For help when defining an address, click ... next to **Address** to display Address Builder.

Address syntax for Honeywell UDC controllers

The format for the address is:

Address [*BitNumber*]

Part	Description
Address	The parameter acronym that defines the UDC parameter. If the parameter value is PV, OP, SP and MD, use the *LOOP* acronym. The advantage of using the *LOOP* acronym is that the server acquires these parameter values in a single communications transaction with the UDC. For the list of UDC parameter acronyms, see each section below, titled: • "UDC 3000 parameter acronyms" • "UDC 5000 parameter acronyms" • "UDC 6000 parameter acronyms"
BitNumber	For UDC digital parameter values with codes between 128 and 255, enter the starting bit number for values contained in packed binary information. Bits are numbered from right to left as shown. Point parameters with a bit width greater than 1, reference successive bits from right to left. UDC Digital Parameter Bit Numbering 

UDC 3000 parameter acronyms

You can use the following UDC 3000 acronyms when entering the source or destination controller address for a point parameter.

Attention

For a complete list of UDC 3000 parameters and parameter numbers used by the server, see the file, *udc3000_def* in the server's *\data* folder. If you need to use the parameter numbers for parameters not supported by the server software, you can find the full list in the UDC documentation.

AdaptiveOption	Input1Bias	MathsOption
AdapTune	Input1Char	OP

Alarm1SP1Type	Input1Filter	OPCalib0
Alarm1SP2Type	Input1High	OPCalib100
Alarm2SP1Type	Input1Low	OPrate
Alarm2SP2Type	Input1Type	OptionStatus
Algo	Input2	Override1
Burnout	Input2Char	OverrideSelect
CSP	Input2Filter	PIDsets
CycleTime1	Input2High	PV
CycleTime2	Input2install	Rate1
DecPntLoc	Input2Low	Rate2
DigIn1	Input2option	Reset1
DigIn2	Input2Type	Reset2
DigInSta	InputFn2	SetPointProg
Emissivity	InternalRV	SPSelect
ErrorStatus	Loop	SwType
Frequency	LSP1	SwVersion
Gain1	LSP2	TempUnits
Gain2	LSPselect	
Input1	ManualReset	

UDC 5000 parameter acronyms

You can use the following UDC 5000 acronyms when entering the source or destination controller address for a point parameter.

Attention

For a complete list of UDC 5000 parameters and parameter numbers used by the server, see the file, *udc5000_def* in the server's *\data* folder. If you need to use the parameter numbers for parameters not supported by the server software, you can find the full list in the UDC documentation.

Alarm1Sp1Type	Input2Bias	LSP1
Alarm1Sp2Type	Input2Burnout	LSP2
Alarm2Sp1Type	Input2Char	LSP3
Alarm2Sp2Type	Input2Emis	LSPselect
Algo	Input2Filter	LSPselect2
Algo2	Input2High	ManualReset
ATune	Input2install	MathsOption
AutotuneOption	Input2Low	OP
CSP	Input2option	OptionStatus
CycleTime1	Input2Override	Override1
CycleTime2	Input2Type	Override2
DigInput1	Input3	Override3
DigInput2	Input3Bias	PIDsets
Dropoff	Input3Char	PIDsets2
ErrorStatus	Input3Filter	PV

Gain1	Input3High	PVOverride
Gain2	Input3install	Rate1
InAlgo2	Input3Low	Rate2
InAlgo3	Input3option	Reset1
Input1	Input3Override	Reset2
Input1Burnout	Input3Ratio	SPOverride
Input1Char	Input3Type	SPPOption
Input1Emis	InputBias	SPRamp
Input1High	InputFilter	SPSelect
Input1Low	InternalRV	SWType
Input1Override	Loop	SWVersion
Input1Type	Loop2option	
Input2	Loop2Sel	

UDC 6000 parameter acronyms

You can use the following UDC 6000 acronyms when entering the source or destination controller address for a point parameter.

Attention

For a complete list of UDC 6000 parameters and parameter numbers used by the server, see the file, *udc6000_def* in the server's *\data* folder. If you need to use the parameter numbers for parameters not supported by the server software, you can find the full list in the UDC documentation.

8SegChar	Input1Low	OPCalib0
AdaptiveOption	Input1Ratio	OPCalib100
AdapTune	Input1Type	OPrate
AdapTune2	Input2	OPrate2
Alarm1SP1Type	Input2Bias	OptionStatus
Alarm1SP2Type	Input2Char	Override1
Alarm2Sp1Type	Input2Filter	Override2
Alarm2SP2Type	Input2High	OverrideSelect
Algo	Input2Low	PIDsets
Algo2	Input2option	PIDsets2
CSP	Input2Ratio	Polynomial
CycleTime1	Input2Type	PV
CycleTime2	Input3	Rate1
DigInput1	Input3Bias	Rate2
DigInput2	Input3Char	Reset1
ErrorStatus	Input3Filter	Reset2
Gain1	Input3High	Sched1gain
Gain2	Input3Low	Sched1gain2
Gate1	Input3option	Sched1PV
Gate1InAAna	Input3Ratio	Sched1PV2
Gate1InASta	Input3Type	Sched2gain

Gate1InBAna	Input4	Sched2gain2
Gate1InBSta	Input4Bias	Sched2PV
Gate1Out	Input4Char	Sched2PV2
Gate2	Input4Filter	Sched3gain
Gate2InAAna	Input4High	Sched3gain2
Gate2InASta	Input4Low	Sched3PV
Gate2InBAna	Input4option	Sched3PV2
Gate2InBSta	Input4Ratio	Sched4gain
Gate2Out	Input4Type	Sched4gain2
Gate3	Input5	Sched4PV
Gate3InAAna	Input5Bias	Sched4PV2
Gate3InASta	Input5BurnOut	Sched5gain
Gate3InBAna	Input5Char	Sched5gain2
Gate3InBSta	Input5Emmis	Sched5PV
Gate3Out	Input5Filter	Sched5PV2
Gate4	Input5High	Sched6gain
Gate4InAAna	Input5Low	Sched6gain2
Gate4InASta	Input5option	Sched6PV
Gate4InBAna	Input5Pulse	Sched6PV2
Gate4InBSta	Input5Ratio	Sched7gain
Gate4Out	Input5Type	Sched7gain2
Gate5	InternalRV	Sched7PV
Gate5InAAna	Logic	Sched7PV2
Gate5InASta	Loop	Sched8gain
Gate5InBAna	Loop2option	Sched8gain2
Gate5InBSta	Loop2Sel	Sched8PV
Gate5Out	LSP1	Sched8PV2
InAlgo1	LSP2	SPRamp
InAlgo2	LSP3	SPRate
Input1	LSPselec2t	SwType
Input1Bias	LSPselect	SwVersion
Input1Char	ManualReset	Totalizer
Input1Filter	MathsOption	
Input1High	OP	

Troubleshooting Honeywell UDC Issues

This section describes tasks for the UDC controller that you perform either on the server or from any Station.

Related topics

“Testing Honeywell UDC communications with the server” on page 26
“Using the hdwconfig utility with Honeywell UDC” on page 27
“Troubleshooting Honeywell UDC upload and download errors” on page 28

Testing Honeywell UDC communications with the server

You use the Honeywell UDC test utility, **udctst**, to test communications between the server and the UDC controller after you have downloaded channel and controller definitions to the server database.

Attention
When the server is sending controls (writes) to a UDC, it is not possible to configure that UDC by using the UDC operator interface display. This applies not only when testing communications, but also when scanning and configuring a UDC.

See the *UDC Product Manual* for details about UDC parameter numbers.

CAUTION
Do not run **udctst** while the server is communicating with UDCs—this may interfere with communications between them.

Prerequisites

- Set up the controller.
- Connect all cables.
- Define the controller and channel in Quick Builder.
- Download the Quick Builder definitions to the server, without errors.
- Ensure the channel is out of service.

Attention
The server need not be running while using the utility as long as the server database service is running.

To run the udctst utility

1 Open a Command Prompt window.

2 Type **udctst** and then press Enter.

3 Follow the directions as prompted.

You can read and write data to all registers that can be addressed by the server.

For help while using this utility, type **?**.

4 To test the communication link, use the *Find* command. This determines which UDC communication addresses are responding on the specified channel.

The communication addresses (that you set up on the UDCs and specified in your Quick Builder project file) should reply with a "responding" message. If this is not happening, ensure that:

- Communication wiring is correct.
- Communication parameters that you set up in the UDC, such as baud, agree with those you defined in Quick Builder.
- The Stallion serial port (if used) has been set to use the RS-485 protocol.
- The port is working by connecting to another serial device.

5 To quit, type **q** and the press Enter.

Related topics

“Planning considerations for installing and configuring Honeywell UDC controllers” on page 5

Using the hdwconfig utility with Honeywell UDC

You use the configuration utility **hdwconfig** to save the server's configuration image of a UDC channel/ controller to a file. (You can also restore the image from this file). Saving the configuration image to a file is useful for archiving purposes, as well as for transferring a configuration from one server to another.

Before saving, ensure that the server's configuration image reflects that of the UDC by performing an upload.

You run **hdwconfig** from a Command Prompt window.

To save channel or controller configuration data to a file, the syntax is:

```
HDWCONFIG SAVE file {-CHN cc|-RTU rr} [-RENEW]
```

To restore channel or controller configuration data from a file to the specified channel or controller with the same channel and controller, the system must be running and the controllers must be disabled. The syntax is:

```
HDWCONFIG RESTORE file {-CHN cc| cc-RTU rr} [-FROM nn]
```

To display a list of channels and controllers whose configuration data is contained in the file, the syntax is:

```
HDWCONFIG LIST file
```

Option	Description
SAVE file	Saves the configuration image to *file*.
RESTORE file	Restores configuration details from *file*.
LIST file	Displays a list of the channels and controllers contained in *file*
-CHN cc	Channel *cc*
-RTU rr	Controller *rr*
-RENEW	Saves the configuration from the specified file.
-FROM nn	Used in conjunction with *-RTU nn* to restore controllers from *nn* to *rr*.

Example

To save the configuration for controller 21 as file *box21*, type:

```
hdwconfig save box21 -rtu 21
```

Troubleshooting Honeywell UDC upload and download errors

If errors occur while using Station to upload or download configuration data from the server to the controller, the parameter numbers of the affected parameter(s) are displayed in Station's Message Zone and are written to the log file.

Cause

These errors could be due to:

- Communications problems with the UDC
- Attempting to upload or download an incorrect configuration

Configuration parameter numbers associated with UDC configuration parameters are described in the following files in the server's *\data* folder:

- *udc3000_def*
- *udc5000_def*
- *udc6000_def*

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How to report a security vulnerability

For the purpose of submission, a security vulnerability is defined as a software defect or weakness that can be exploited to reduce the operational or security capabilities of the software.

Honeywell investigates all reports of security vulnerabilities affecting Honeywell products and services.

To report a potential security vulnerability against any Honeywell product, please follow the instructions at:

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- Send an email to security@honeywell.com.

  or

- Contact your local Honeywell Process Solutions Customer Contact Center (CCC) or Honeywell Technical Assistance Center (TAC) listed in the “Support and other contacts” section of this document.

Support

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Training classes

Honeywell holds technical training classes on Experion PKS. These classes are taught by experts in the field of process control systems. For more information about these classes, contact your Honeywell representative, or see http://www.automationcollege.com.

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