Chapter 7. Robots

The Cluster Library is made of individual chapters such as this one. See Document Control in the Cluster Library for a list of all chapters and documents. References between chapters are made using a *X.Y* notation where *X* is the chapter and *Y* is the sub-section within that chapter.

7.1. General Description

7.1.1. Introduction

The clusters specified in this section define the operation of robotic devices, such as Robotic Vacuum Cleaners (RVCs).

7.1.2. Cluster List

This section lists the RVC specific clusters as specified in this chapter.

Table 39. Overview of the RVC Clusters

Cluster ID	Cluster Name	Description
0x0054	RVC Run Mode	Commands and attributes for controlling the running mode of an RVC device.
0x0055	RVC Clean Mode	Commands and attributes for controlling the cleaning mode of an RVC device.
0x0061	RVC Operational State	Commands and attributes for monitoring and controlling the operational state of an RVC device.

7.2. RVC Run Mode Cluster

This cluster is derived from the Mode Base cluster to define specifics for Robotic Vacuum Cleaner devices. It also defines a namespace for the running modes of these devices.

7.2.1. Revision History

The global ClusterRevision attribute value SHALL be the highest revision number in the table below.

Revision	Description
1	Initial Release

7.2.2. Classification

Hierarchy	Role	Scope	PICS Code
Mode Base	Application	Endpoint	RVCRUNM

7.2.3. Cluster ID

ID	Name
0x0054	RVC Run Mode

7.2.4. Data Types

7.2.4.1. ModeOptionStruct Type

The table below lists the changes relative to the Mode Base cluster for the fields of the ModeOptionStruct type. A blank field indicates no change.

ID	Name	Type	Constraint	Quality	Default	Access	Conformance
0	**Label**						M
1	**Mode**						M
2	**ModeTags**		1 to 8				M

At least one SupportedMode attribute list entry SHALL include the Idle mode tag in the ModeTags field.

At least one SupportedMode attribute list entry (different from the one above) SHALL include the Cleaning mode tag in the ModeTags field.

The Cleaning and Idle mode tags are mutually exclusive and SHALL NOT both be used together in a mode's ModeTags.

7.2.5. Attributes

7.2.5.1. StartUpMode Attribute

If this attribute is supported, the device SHOULD initially set this to one of the supported modes that has the Idle tag associated with it. See the Mode Base cluster specification for full details about this StartUpMode attribute.

7.2.6. Derived Cluster Namespace

This namespace includes definitions for data associated exclusively with the derived cluster.

7.2.6.1. ChangeToModeResponse Command Namespace Definitions

The following table defines the derived cluster specific StatusCode values.

Status Code Value	Name
0x41	**Stuck**
0x42	**DustBinMissing**
0x43	**DustBinFull**
0x44	**WaterTankEmpty**
0x45	**WaterTankMissing**
0x46	**WaterTankLidOpen**
0x47	**MopCleaningPadMissing**
0x48	**BatteryLow**

7.2.6.2. Mode Tags

The following table defines the derived cluster specific ModeTag values.

Mode Tag Value	Name
0x4000	**Idle**
0x4001	**Cleaning**

7.2.6.2.1. Idle Tag

The device is not performing any of the main operations of the other modes. However, auxiliary actions, such as seeking the charger or charging, may occur.

For example, the device has completed cleaning, successfully or not, on its own or due to a command, or has not been asked to clean after a restart.

7.2.6.2.2. Cleaning Tag

The device was asked to clean so it may be actively running, or paused due to an error, due to a pause command, or for recharging etc. If currently paused and the device can resume it will continue to clean.

7.2.7. Mode Examples

Starting a cleaning cycle is done by switching from a mode with the Idle tag to a mode with the Cleaning tag.

Stopping a cleaning cycle is done by switching from a mode with the Cleaning tag to a mode with the Idle tag.

7.3. RVC Clean Mode Cluster

This cluster is derived from the Mode Base cluster to define specifics for Robotic Vacuum Cleaner devices. It also defines a namespace for the cleaning type for these devices.

7.3.1. Revision History

The global ClusterRevision attribute value SHALL be the highest revision number in the table below.

Revision	Description
1	Initial Release

7.3.2. Classification

Hierarchy	Role	Scope	PICS Code
Mode Base	Application	Endpoint	RVCCLEANM

7.3.3. Cluster ID

ID	Name
0x0055	RVC Clean Mode

7.3.4. Data Types

7.3.4.1. ModeOptionStruct Type

The table below lists the changes relative to the Mode Base cluster for the fields of the ModeOptionStruct type. A blank field indicates no change.

ID	Name	Type	Constraint	Quality	Default	Access	Conformance
0	**Label**						M
1	**Mode**						M
2	**ModeTags**		1 to 8				M

At least one SupportedMode attribute list entry SHALL include the Vacuum and/or the Mop mode tag in the ModeTags field list.

7.3.5. Derived Cluster Namespace

This namespace includes definitions for data associated exclusively with the derived cluster.

7.3.5.1. ChangeToModeResponse Command Namespace Definitions

The following table defines the derived cluster specific StatusCode values.

Status Code Value	Name
0x40	**CleaningInProgress**

7.3.5.2. Mode Tags

The following table defines the derived cluster specific ModeTag values.

Mode Tag Value	Name
0x4000	**DeepClean**
0x4001	**Vacuum**
0x4002	**Mop**

7.3.5.2.1. Deep Clean Tag

While in this mode, the device is optimizing for improved cleaning.

7.3.5.2.2. Vacuum Tag

The device’s vacuuming feature is enabled in this mode.

7.3.5.2.3. Mop Tag

The device’s mopping feature is enabled in this mode.

7.3.6. Mode Examples

A few examples of modes and their mode tags are provided below.

For the "Turbo, Vacuum Only" mode, tags: 0x4000 (Deep Clean), 0x4001 (Vacuum).

For the "Mop Only" mode, tags: 0x4002 (Mop), 0x0003 (Low Noise).

For the "Rapid Vacuum and Mop" mode, tags: 0x0001 (Quick), 0x4001 (Vacuum), 0x4002 (Mop).

Note that the "Low Noise" and "Quick" mode tags are defined in the generic Mode Base cluster specification.

7.4. RVC Operational State Cluster

This cluster provides an interface for monitoring the operational state of a Robotic Vacuum Cleaner.

7.4.1. Revision History

The global ClusterRevision attribute value SHALL be the highest revision number in the table below.

Revision	Description
1	Initial release

7.4.2. Classification

Hierarchy	Role	Scope	PICS Code
Operational State	Application	Endpoint	RVCOPSTATE

7.4.3. Cluster ID

ID	Name
0x0061	RVC Operational State

7.4.4. Data Types

7.4.4.1. OperationalStateEnum Type

This data type is derived from enum8.

The values defined herein are applicable to this derived cluster of Operational State only and are additional to the set of values defined in Operational State itself.

Value	Name	Summary	Conformance
0x40	**SeekingCharger**	The device is en route to the charging dock	M
0x41	**Charging**	The device is charging	M
0x42	**Docked**	The device is on the dock, not charging	M

7.4.4.2. ErrorStateEnum Type

This data type is derived from enum8.

The values defined herein are applicable to this derived cluster of Operational State only and are additional to the set of values defined in Operational State itself.

Value	Name	Summary	Conformance
0x40	**FailedToFindChargingDock**	The device has failed to find or reach the charging dock	M
0x41	**Stuck**	The device is stuck and requires manual intervention	M
0x42	**DustBinMissing**	The device has detected that its dust bin is missing	M

Value	Name	Summary	Conformance
0x43	**DustBinFull**	The device has detected that its dust bin is full	M
0x44	**WaterTankEmpty**	The device has detected that its water tank is empty	M
0x45	**WaterTankMissing**	The device has detected that its water tank is missing	M
0x46	**WaterTankLidOpen**	The device has detected that its water tank lid is open	M
0x47	**MopCleaningPadMissing**	The device has detected that its cleaning pad is missing	M