DALI-2 Instances & Functional Behavior

HYTRONIK®
SENSORS & LIGHTING CONTROL

DALI-2 Instances & Functional Behavior

1. Instances Overview

The multi-sensor implements two DALI-2 standardized instances:

- Instance 0- Occupancy Sensor (303)
- Instance 1-Light Sensor (304)

Each instance is uniquely numbered within the device.

2. Instances-General

Each instance can be configured independently. Settings that apply identically to all sensor instances are described in this section.

Instance-specific parameters are detailed in the following sections for each instance type.

General Instance Settings

- Enable / Disable

Each instance can be individually enabled or disabled. Disabled instances do not send events or update measured values, but their values can still be retrieved via Query commands, and all DALI-2 configuration commands remain supported.

- Event Scheme

The event scheme determines the addressing information included in each event message. This information is required for recognition and filtering of events on the DALI bus. Five options are available:

1. Instance Addressing: instance type + instance number
2. Device Addressing: device address +instance type
3. Device/Instance Addressing: device address +instance number
4. Device Group Addressing: device group + instance type 5. Instance Group Addressing: instance group instance type Definitions:

Instance group: up to three instance groups can be assigned for each instance. Only the "Primary Group" is used for the event. Instance type: the instance type defines which DALI-2 standard is valid for this instance. (The different instance types are specified in the DALI-2 standard.) Instance number:

Each instance in a device has a unique instance number. Device group: The device can be assigned to up to 32 device groups (0...31). The lowest device group is used for the event. Device address: a device address (or short address) (0...63) can be assigned to each device. With this the device can be clearly addressed. (Identical short addresses should be avoided.)

- Event Priority

Event priority defines the order in which events are transmitted when multiple events occur simultaneously. Priority 2 is the highest, and priority 5 is the lowest.

- Dead Time

Dead time can be configured for each instance. It defines the minimum interval that must elapse before the same event can be transmitted again—even if the measured value has changed. Dead time may be disabled if not required.

- Report Time

If the measured value does not change, the event is sent cyclically based on the configured report time. The report time can be set for each instance. It determines the maximum time between a sent event and re-sending

- Hysteresis

Not every value change generates an event. Hysteresis defines the percentage change required to trigger a new transmission. The hysteresis band is not symmetrical:

1. Increasing value: an event occurs only if the next value is below the previous value minus hysteresis, or above the previous value.
2. Decreasing value: an event occurs only if the next value is above the previous value plus hysteresis, or below the previous value.
3. Hysteresis Min: defines the minimum hysteresis value that cannot be undercut.

3. Instance 0-Motion (303)

- Overview

Instance 0 is a DALI-2 standardized instance defined in IEC 62386-303 for motion-detection sensors. All functional behaviors follow the standard, and the instance is fully DALI-2 certified.

- State Definitions

The sensor operates using three possible states:

1. People in the room and movement—(0xFF)
2. People in the room and no movement — (0xAA)
3. Empty room-(0x00)

- State Transition Logic

If movement is detected, the sensor immediately enters the state "People in the room and movement" (OxFF).

This state is exited after 1 second at the earliest if no further movement is detected. In this case it changes to the state "People in the room and no movement".

(0xAA).

- Hold Time

Hold time defines the duration before the sensor transitions from "People in the room and no movement"

(0xAA) to "Empty room" (0x00). If movement is detected during this time the state is changed back to:

"People in the room and movement" (0xFF). (min. 1 second)

- Query Input Value

The current occupancy status can be retrieved with a DALI Query command. Possible return values: 0x11、0xAA、 0xFF

- Event

The sensor status is transmitted by events. The following event information is available:

After the configured hold time expires, the state transitions to "Empty room" (0x00).

Event name	Event Information	Description
No movement	00 0000 ---0b	No movement detected. Corresponding trigger is the 'No movement' trigger.
Movement	00 0000 ---1b	Movement detected. Corresponding trigger is the 'Movement' trigger.

Vacant	00 0000 -00-b	The area has become vacant. Corresponding trigger is the 'Vacant' trigger.
Still vacant	00 0000 -10-b	The area is still vacant. The event occurs at regular intervals as long as the vacant condition holds. Corresponding trigger is the 'Repeat' trigger.
Occupied	00 0000 -01-b	The area has become occupied. Corresponding trigger is the 'Occupied' trigger.
Still occupied	00 0000 -11-b	The area is still occupied. The event occurs at regular intervals as long as the occupied condition holds. Corresponding trigger is the 'Repeat' trigger.
Movement sensor	00 0000 1---b	The current event is triggered by a movement based sensor.
	1x xxxx xxxxb	Reserved.
	01 xxxx xxxxb	
	00 1xxx xxxxb	
	00 01xx xxxxb	
	00 001x xxxxb	
	00 0001 xxxxb	

Refer to IEC 62386-303 for further event encoding details.

- Event filter

The event filter defines for which status change an event is generated. Filter arrangement:

1. Bit0: Occupied Event active
2. Bit1: Vacant Event active
3. Bit2: Still Vacant/Occupied Event active
4. Bit3: Movement Event active
5. Bit4: No Movement Event active
6. Bit5..Bit7: unused

- Report Time

Report time can only be set if the event filter "Repeat" is activated and the events: "Still Vacant" and "Still Occupied" are enabled. Thel time between sending a "Still-Event" again is determined by the Report Time.

4. Configuring Instance 0-Occupancy Sensor

1. Set filter (SET EVENT FILTER): 1 Byte, corresponding relationship of each BIT and default value are as follows:

Bit	Description	Value	Default
0	Occupied event enabled?	“1" = “Yes”	1
1	Vacant event enabled?	“1" = “Yes”	1
2	Repeat event enabled?	“1" = “Yes”	0
3	Movement event enabled?	“1" = “Yes”	0
4	No movement event enabled?	“1" = “Yes”	0
5	Reserved	0	0
6	Reserved	0	0
7	Reserved	0	0

Command value：0x68

2. Set Hold Time -SET HOLD TIMER (DTR0)

1 Byte (1-255), Actual value: HOLD TIMER = 10S, Command value: 0x21

3. Set Report Time-SET REPORT TIMER (DTR0)

1 Byte (0-255), Actual value: REPORT TIMER = 1S, Command value: 0x22

4. Set Dead Time -SET DEAD TIME TIMER (DTR0)

1 Byte (0-255), Actual value: DEAD TIME TIMER = 50 ms, Command value: 0x23

5. Set Sensor Sensitivity - SET SENSITIMITY (DTR0)

1 Byte (0-100), Valid range: 0-15, (0= highest sensitivity, 15 = lowest sensitivity), Command value: 0x26

6. Query Sensor Sensitivity - SET SENSITIVITY (DTR0)

1 Byte (0-100), Command value: 0x2b

7. Query Instance Resolution - QUERY RESOLUTION

Resolution=2, Command value: 0x81

8. Query Input Value-QUERY INPUT VALUE

Input values of occupancy sensor (4 values: 0, 0x55, 0xaa, 0xff), This command value: 0x8c

5. Instance 1-Light Intensity (304)

- Overview

Instance 1 complies with the DALI-2 IEC 62386-304 standard for light-intensity measurement. It is fully DALI-2 certified.

- Measurement Behavior

The current light value (lux) is measured continuously. It can be obtained either using a DALI "Query" command or by receiving automatically generated events. Measuring range: 0-1000 lux, The resolution differs between queries and generated events. A query supports an event resolution of 10Lux (10Bit).

- Hysteresis

Not every value change generates an event. Hysteresis defines the percentage change required to trigger a new transmission. The hysteresis band is not •

- symmetrical:

1. Increasing value: an event occurs only if the next value is below the previous value minus hysteresis, or above the previous value.
2. Decreasing value: an event occurs only if the next value is above the previous value plus hysteresis, or below the previous value.
3. Hysteresis Min: defines the minimum hysteresis value that cannot be undercut.

- Event Filter

This instance generates a single light-level event with 10-bit resolution (ux range 0-1023 lux in increments of 10-lux steps). If the event filter is disabled, no events will be sent.

- Event

The illuminance level is transmitted by event. The following event information is available:

Event name	Event Information	Description
Illuminance level report	Illuminance Event	An illuminance level report, passing the actual illuminance level along.

Refer to IEC 62386-304 for further event encoding details.

6. Configuring Instance 1 – Light Sensor

1. Set filter (SET EVENT FILTER): 1 Byte, only 1 BIT used, corresponding relationship and default value are as follows:

Bit	Description	Value	Default
0	Illuminance level event enabled?	“1" = “Yes”	1
1	Reserved	0	0
2	Reserved	0	0
3	Reserved	0	0
4	Reserved	0	0
5	Reserved	0	0
6	Reserved	0	0
7	Reserved	0	0

Command value：0x68

2. Set Report Time – SET REPORT TIMER (DTR0)

1 Byte (0–255) , Actual value: REPORT TIMER = 1S, Command value: 0x30

3. Set Dead Time – SET DEAD TIME TIMER (DTR0)

1 Byte (0–255), Actual value: DEAD TIME TIMER = 50 ms, Command value: 0x32

4. Set Hysteresis – SET HYSTERESIS (DTR0)

1 Byte (0–25%), Actual value: HYSTERESIS × current illuminance, Command value: 0x31

5. Set Hysteresis Min – SET HYSTERESIS MIN (DTR0)

1 Byte (0–255), Command value: 0x33

6. Query instance resolution – QUERY RESOLUTION

Resolution = 10， Command value: 0x81

7. Query instance current value – QUERY INPUT VALUE

Current illuminance (0–1000 lux)， Command value: 0x8c

8. Query Input Value Latch – QUERY INPUT VALUE LATCH

Command value: 0x8d

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