UltraLink Daylight Harvesting

Application note

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1. Introduction

Daylight harvesting is a lighting control strategy used to maintain the required light level in the work area and reduce energy use. Luminaires adjust their light level automatically in response to changes in daylight.

1.1 Operation

Daylight harvesting is based on a closed-loop method which uses sensors to constantly monitor the light level in the room. The sensors send the measured light level to all controllers in the zone. The controllers then adjust the light level of the luminaires to maintain the level defined by the user. The user can also specify that the luminaires maintain a minimum light level even if there is enough daylight available.



1.2 Requirements

- Access to the project in the <u>UltraLink web app</u>.
- UltraLink mobile app installed on an iOS or Android mobile device.
- At least one daylight zone configured with a control profile based on a daylight harvesting scenario¹.
- A Bluetooth mesh light sensor and a controller installed in each zone.
- A light meter to calibrate daylight harvesting.

¹ For examples of daylight harvesting applications, see <u>UltraLink Lighting Control</u>.



2. Light sensor recommendations

Selecting the correct light sensor and its position is necessary for the correct work of daylight harvesting.

2.1 Selecting the sensor

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To select the correct sensor and its position for your application, follow the recommendations of the manufacturer. Contact the manufacturer for help with your project layout and sensor locations. Make sure that the sensor has the correct field of view, which can be different for different orientations of the sensor, and that it does not monitor light from outside this field.

2.2 Positioning the sensor

- Install the sensor so that it is vertically above the surface where you want to maintain the required light level.
- Install the sensor far enough from windows so that no direct sunlight falls on the sensor. Take the field of view and height of the sensor into account.
- Make sure that the light from the luminaires does not fall on the sensor. Take the light distribution of the luminaires into account.
- Do not install the sensor above highly reflective surfaces.
- Make sure that the sensor monitors only the light from the surface covered by the controlled luminaires.
- Make sure that nothing blocks the field of view of the sensor.



2.3 Examples of good and bad positioning





3. Commissioning

3.1 Creating and configuring the zones

1.	Define lighting zones. Refer to the appropriate regulations that apply to your project. See <u>UltraLink</u>					
	Lighting Control for examples of daylight	harvesting applicatio	ns.			
	Ult	traLink web app				
2.	In the <u>UltraLink web app</u> , go to the proj	ect and area.				
3.	Click on the floor or site plan to add a zone that will use daylight harvesting.					
4.	From the Profile list, select a control profile based on the Occupancy sensing with daylight harvesting or Vacancy sensing with daylight harvesting scenarios.	Zone name * Office Profile P2. Open office	- 1	P1. Conference Room Vacancy sensing with daylight harvesting P2. Open office Occupancy sensing with daylight harvesting P3. Break room Vacancy sensing P4. Egress corridor		
			CLOSE	Occupancy sensing P5. Storage room Manual control P6. Restroom		
5.	Click \checkmark and edit the profile ² .					
 6. To reduce the energy use, you can lower the maximum light level. To do this, set a lower Max. value for the Low/high-end trim. 						
	The light level will not go above t	the Max. value when i	n auto mo	ode.		
	If you want to use manual control, do not set Max. too low because the light level will not go above Max. , for example, when using a wall switch.					
7.	Click Save to save the profile.					
8.	Repeat steps 3–4 to create more zones	in this area that shou	ld be cont	rolled using this behavior and		
	assign this daylight harvesting profile to	each zone.				
9.	Repeat steps 3–8 to create zones in this harvesting behavior.	s area that should be o	controlled	using a different daylight		
10.	Go to the remaining areas and repeat st	eps 3-9 to create zor	nes and as	sign a davlight harvesting profile		

² For information about parameters, see <u>UltraLink Activation and Commissioning user manual</u>.



^{10.} Go to the remaining areas and repeat steps 3–9 to create zones and assign a daylight harvesting profile to each zone.

3.2 Preparing for calibration

3.2.1 Recommendations

- Install all interior finishes, furniture, and equipment.
- Make sure that there are normal daylight conditions and turn off all luminaires in adjacent zones.
 To decrease the calibration error, the measured light level must be at least 75% of the light level set in the zone and at least 100 lx.
- Do not stand next to the light meter when you read the values and calibrate.
- Make sure that windows and skylights are not covered.

3.2.2 Examples of good and bad conditions





3.2.3 Principle of calibration

Calibration calculates the coefficient A that defines the relation between the light level on the monitored surface and the light level measured by the sensor:

$$A = \frac{light \ level \ measured \ by \ the \ meter \ on \ the \ monitored \ surface}{light \ level \ measured \ by \ the \ sensor}$$

The UltraLink app adjusts the light level measured by the sensor using coefficient A so that the sensor displays the light level that is expected to be on the surface.

For best performance, calibrate during the day when the light level is close to the light level set in the profile selected for the zone. The figures show how daylight harvesting works when conditions are much different than when the sensor was calibrated.







3.3 Calibrating the zones

1. Go on site	e to a daylight harvesting zone.				
	UltraLink mobile app				
 In the Ult Add devic 	raLink mobile app, open the project, area, and zone. ces to the zone.	"II ≎ <		9:41 AM Red office	100% 📼
If t	ake sure that there is no warning on the Devices tab. here is a warning, tap Configure all or Repair .	DE Dayli	VICES - 6 ght control is	SETTINGS not calibrated	TEST
4. On the De 5. Tap a togg To find th the correc	evices or Settings tab, tap Calibrate. gle switch to select the correct sensor for the zone. le sensor, tap يُ next to a sensor name to make sure that ct sensor flashes.	الْحُرْدُ الْحَرْدُ ا	Device a8ab AUTO-PROXY TH Sensor A3 AUTO-PROXY RI Sensor F0 AUTO-PROXY	ME AUTHORITY	~ ~ ~
 Put a light surface w In the Me meter in lu the minim 	t meter so that it is vertically below the sensor on the there you want to maintain the required light level. Easured light level field, enter the value shown on the light ux (lx). Make sure that the measured light level is at least num shown below the Measured light level field.	-ْجُ- -ْجُ- -ْجُ-	Device 7e2e AUTO-PROXY Device d2f5 AUTO-PROXY Sensor 3F AUTO-PROXY		~ ~ ~
For leve zon Foll	best performance, calibrate when the measured light el is close to the level set in the profile selected for this e. ow <u>Calibration recommendations</u> to make sure that	چ ان.		9:41 AM	+
8. Tap Calib will be cal Afte	rate. The selected sensor and all controllers in that zone librated. er the calibration is completed, the calibrated zone is to auto mode. All other linked zones go to their		elect light Sensor A Sensor F(Calibration sensor	
	ou change or replace the sensor, you must calibrate in.	o) Ca	Sensor 31	-	0
9. Repeat sto	eps 3–8 for each daylight harvesting zone.	Mit	easured ligh nimum 200 lx re Show	advanced settings	



SHOW

How to perform calibration?

4. Troubleshooting

Problem	Cause	Solution		
"Calibrate" button does not	A scenario other than the Occupancy sensing with daylight harvesting or Vacancy sensing with daylight harvesting is set up for the zone.	In the UltraLink web app, set a profile based on the Occupancy sensing with daylight harvesting or Vacancy sensing with daylight harvesting scenarios for this zone.		
	No light sensor available in the zone.	Add a light sensor to the zone.		
	No light sensor selected in the zone.	Tap a toggle switch to select the sensor.		
		Make sure that the light level in the control profile is not set too high.		
Calibration does not start when I tap "Calibrate".	Measured light level is less than 75% of	Wait for more sunlight.		
	the level set in the zone or less than 100 lx.	If the required minimum light level cannot be achieved, because for example you must calibrate at night, follow <u>Calibrating in bad</u> <u>conditions</u> .		
	Light sensor is installed in a different	Position the sensor so that the light from the luminaires is in the field of view of the sensor. Calibrate again.		
Calibration There are some issues with the light sensor. Please check if it is installed correctly and try again.	an incorrect light sensor has been selected.	Select the correct light sensor for the zone. To find the sensor, tap [©] next to a sensor name to make sure that the correct sensor flashes. Calibrate again.		
CLOSE	Sensor malfunctioning or damaged.	Replace the sensor. Calibrate again.		
	Sensor view is blocked.	Remove anything that blocks the view of the sensor. Calibrate again.		
	Sensor not installed according to the recommendations of the manufacturer.	Follow the <u>Recommendations for selecting the</u> <u>sensor</u> .		
Calibration There were some unexpected changes in the light level. Try again in constant	Clouds reduced the sunlight in the room.			
environmental conditions.	Curtains were being closed.	Maintain constant light conditions in the room.		
CANCEL TRY AGAIN	Sensor view was temporarily blocked by a person or object.	Calibrate again.		
	Light was reflected toward the sensor or from the surface below the sensor.			
Available daylight changes, but light output does not change.	Change in daylight was too small.	Wait until the light level on the monitored surface changes more from the required light level. The light of the luminaires may not be adjusted if the difference between the light level on the surface and the required light level is less than ±8%.		



Problem	Cause	Solution		
Required light level cannot be achieved.	Calibration was done in bad conditions.	Calibrate in good conditions. See <u>Examples of</u> <u>good and bad conditions</u> . If you must calibrate at night, follow <u>Calibrating in bad conditions</u> .		
	Luminaires have degraded over time (lumen depreciation).	In the UltraLink web app, go to the zone and click \checkmark . Then, increase the Max. value for Low/high-end trim. Calibrate again.		
		Replace the luminaires. Calibrate again.		
Daylight harvesting does not work correctly.	Calibration was done in bad conditions.	Calibrate in good conditions. See <u>Examples of</u> <u>good and bad conditions</u> . If you must calibrate at night, follow <u>Calibrating in bad conditions</u> .		
	Light level measured by the sensor is different from the light level on the monitored surface.	Follow <u>Light sensor recommendations</u> and <u>Calibration recommendations</u> .		
	Incorrect calibration or other cause.	Perform a <u>calibration test</u> .		
	The light sensor has been replaced or a different sensor has been selected.			
Daylight harvesting worked correctly for some time but then stopped.	Light distribution in the room has changed, for example as a result of changing the room layout or repainting.	Calibrate again.		
	A luminaire has been added to or removed from the zone.			



4.1 Calibrating in bad conditions

Calibrating in bad conditions can cause daylight harvesting not to work correctly.



4.2 Testing the calibration (for iOS/iPadOS)

	UltraLink mobile app (for iOS/iPadOS)			
1. In the UltraLink	mobile app for iOS/iPadOS, go to the Settings tab.	.ıl ବ	9:41 AM	100% 💻
2. Tap Calibrate to	go to the calibration view.	×	Calibration	1
3. Tap and selec	Select light sensor			
The light	of the luminaires will be adjusted to the values set in	<u>Ö</u> Ser	sor A3	\bigcirc
the profil	e selected for this zone.	<u>Ö</u> Ser	sor F0	
4. If the test show	s any issues, follow <u>Calibration recommendations</u> and	<u>Ö</u> Ser	sor 3F	\bigcirc
calibrate again.		-		
5. If the problem p	persists, go to the calibration view again and tap Show	Calibra	te	
advanced settir	igs.	Measure	d light level	
a. If the lu	ninaire light level oscillates, move the Daylight	Minimum 2	00 lx required	
controll	[Show advanced settings	-	
	Daylight controller		CALIBRATE	
	SLOW FAST	How to perfo	rm calibration?	SHOW
b. If the lu	minaire response is too slow, move the Daylight			



- 6. Calibrate again.
- 7. Perform the calibration test again.



Contact information

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