interact Pro

Design Guide
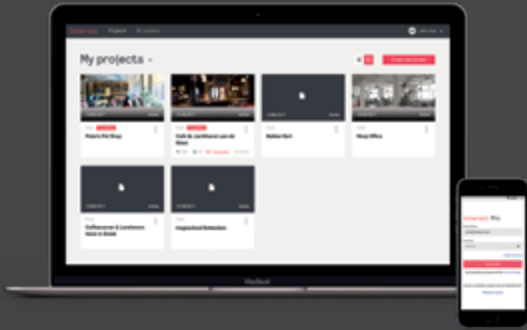
Release 1.0

Works with

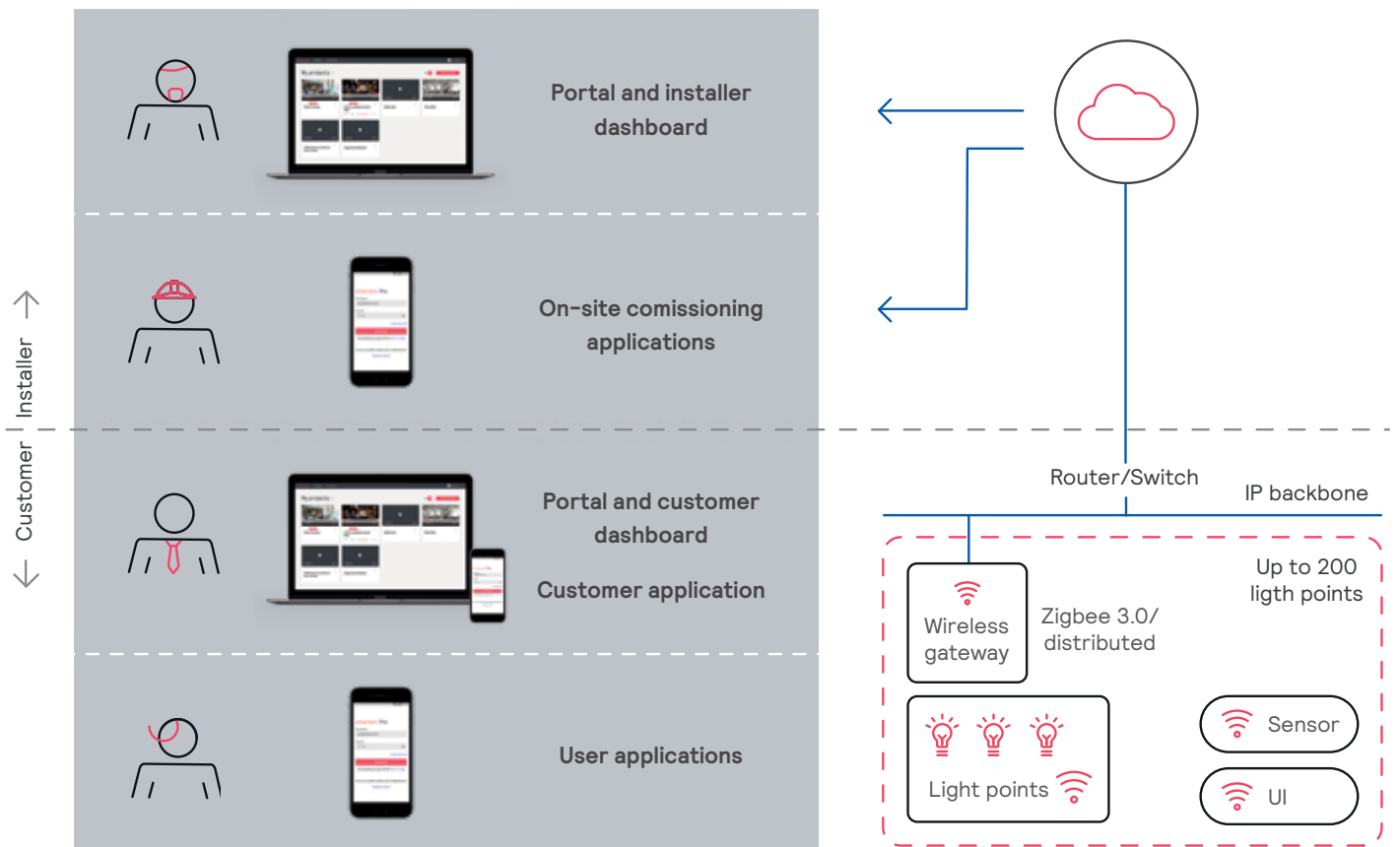Connected lighting

PHILIPS

System Overview

The following sections give a brief overview of the setup of the system and basic knowledge of the system architecture, installation options and equipment.

System Characteristics

Where other systems require complex infrastructure, the **Interact Pro** system is designed for truly wireless control targeted at Small- and Medium-sized Enterprises (SME). Due to it's nature, the system is easy to install in existing lighting infrastructures. While new lighting systems based on LED technology enable significant energy savings, **Interact Pro** can achieve even greater savings, as the system provides simple and highly flexible control through smart devices.

A mobile app for Android and iOS devices provides an intuitive interface for system commissioning and control. An online portal gives the service provider and business owner insight into the operation of the lighting installation, showing current energy consumption, health status reports, and limited control. The diagram below provides a high-level overview of the system design.

High level system architecture of the Interact Pro system

Portal and installer dashboard

On-site comissioning applications

Portal and customer dashboard

Customer application

User applications

Installer

Customer

Router/Switch

IP backbone

Wireless gateway

Zigbee 3.0/ distributed

Up to 200 ligth points

Light points

Sensor

UI

Application Areas

The system is designed to create a connected lighting system in single buildings of the following types:

- Tenant fit out offices
- Small to medium retail stores
- Municipal buildings
- Small industry (for example a small workshop or warehouse)
- Retail banks
- Schools
- Micro hospitals

Interact Pro is optimized for the application spaces above and can connect up to 200 light points per wireless gateway to the cloud. Multiple gateways can be used in one project when the number of light points exceeds 200, or in cases where the wireless signal cannot propagate due to building materials such as steel reinforced concrete.

Each gateway would be used to control a logical area such as a floor or discrete part of the building. Typically, one wireless gateway can cover an area of up to 11,000ft² (1,000m²) or larger. In buildings with lower lighting requirements, warehousing for example, up to 110,000ft² (10,000m²) may be connected.

Currently supported maximum system size
To be able to design the lighting system correctly,
it is important to know its possibilities and limitations.

	Explanation
Per System	Router (customer)
	1 Wireless Gateway
	200 light points (max)
	50 green power sensors / switches, of which 30 may be sensors
	64 groups / zones (max)
	128 scenes
	16 scedules
	Unlimited users
Per Group	16-25 light points (recommended) no limitation
	5 green power sensors and/or switches (max)
	16 scenes

System Components

The combination of several hardware components and system specific firmware and software makes the Interact Pro system. The system consists of the following:

Wireless Gateway
The basis of the lighting system connects the system to the cloud via the IT network and the internet. The wireless gateway connects with the light points by means of a ZigBee mesh network.

Light points
Interact Ready lamps or luminaires equipped to act as nodes within the Zigbee mesh network. A full list of available Interact Ready products can be found at: www.philips.com/interact-ready

Sensor
Device that senses presence of people in an area and triggers the switching of the lighting in the area by means of ZigBee. Daylight dependent regulation is possible with a multi-sensor that supports light sensing and occupancy detection.

Switch
Device that enables the manual control of the lighting in an area, for example switching on and off, dimming and scene selection.

Portal
A cloud-based website for design, installation, commissioning, operation, or management. Access rights of the users determine feature visibility.

App
A small piece of software installed on a smart device (for example a smart phone) that is used for commissioning and operation.

All key components are future proof, as they receive regular firmware and software updates that are pushed over the air (OTA). This process ensures the stable and secure operation of the system and enables the addition of new features and functionality without requiring the customer to install new hardware.
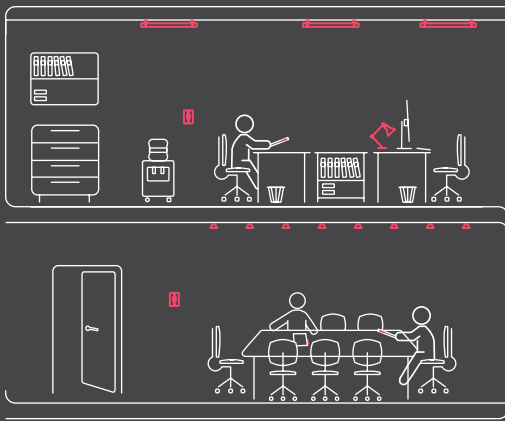
Designing Spaces

The entire portfolio of Interact Ready luminaires, smart lamps, and retrofit kits is available at:

www.philips.com/interact-ready

Prepare a Lighting Layout

Using the building layout, select the appropriate type and quantity of light points for your project.

Establish Projects

Using the Lighting Layout and the maximum system sizes listed above, determine the number and location of the projects for this installation. When the total number of light points is less than 200 and there are no obstructions to the wireless signal, only one wireless gateway is required. More wireless gateways may be required in the following situations::

1. **Challenging building layouts and obstructions**
   When the layout of a space does not allow for two light points to be within 33ft (10m) of each other, or other environmental factors such as steel reinforced walls in the layout do not allow for adequate propagation of the wireless ZigBee signal.

2. **Larger spaces requiring more than 200 light points**
   Each Interact Pro wireless gateway supports up to 200 light points.

Considerations when using multiple wireless gateways
When using more than one wireless gateway in a space, each gateway will appear in the web-based portal or the mobile app as a separate project, therefore it is advisable to divide the building up into separate, logical areas of 200 light points or less and to only assign the light points in one logical area to a single gateway. For example, a small elementary school may be separated by an East and West wing each with < 200 Light points. In this case, two wireless gateways may be installed (one in each wing) and the light points in each wing can then be assigned to the wireless gateway that has been installed in that area.

Note: When commissioning a space with multiple Wireless Gateways, it is strongly advised to only apply power to one gateway and its associated light points at a time during the discovery phase to ensure that the gateway that is being commissioned only discovers the intended light points.

Wireless Gateway Requirements
- Within reach of at least two light points within 33 ft (10 m)
- A non-switched power outlet
- A location where the QR code is accessible for scanning during commissioning
- Unsecured Ethernet connection with DHCP and NTP (TCP port 443 must be open)

Interact Pro Portal as a Service Provider

| Project name	Creation date	Installer	Status	Health	Devices	Total energy usage	
Elementary East Office	2018-08-30 10:12:03	Lighting Electrician 1	Active	● Good	📶 14 ◎ 2	88,205 kWh	⋮
Elementary West Office	2019-03-19 12:24:58	An Installer 1	Active	● Good	📶 4 ◎ 5	2.26 kWh	⋮
Small Business Office Office	2019-03-01 14:21:09	Service Provider	Preparation	● Good	📶 0 ◎ 0	-	⋮
Small Warehouse Warehouse	2018-07-31 12:46:52	An Installer 1	Active	● Good	📶 90 ◎ 28	2447.637 kWh	⋮

Define Groups & Zones

Groups and zones are used to define and control the areas in the application space. The example below shows a simplified floor plan of a building, with typical usage of the areas. The areas are designed with light points that correspond to their usage and are defined as follows:

1. A Group represents a number of lights in a logical area such as a room that all respond together to a control signal.

   Note: Switches and occupancy sensors control a group.

2. A Zone represents a subset of lights within a group. All lights in a zone will always act the same.

   Note: Daylight sensors control a zone.

Cell office   Open plan office   Workshop

Corridor

Meeting room   Storage

Group   Zone
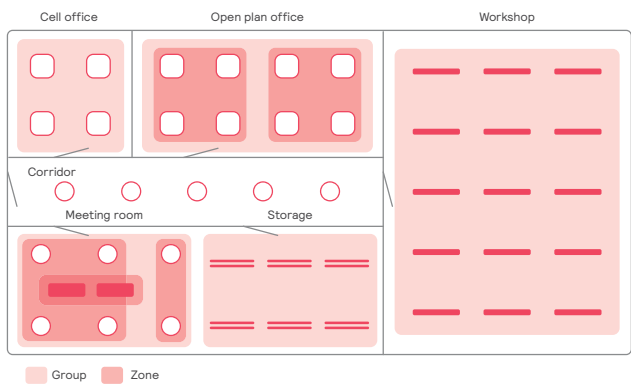
Establish Control Strategies

Meet or exceed code requirements in ASHRAE 90.1 and Title 24 using control strategies. Behaviors are programmed into Interact Pro at the group level, enabling wide application support.
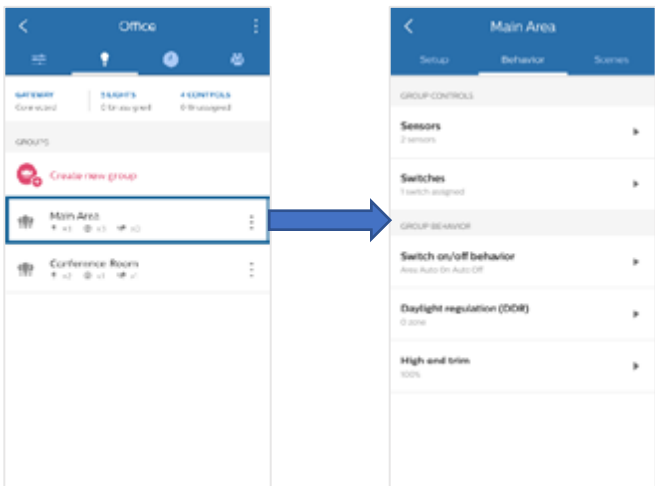
Setting Group Behaviors in the mobile app (see the Quick Energy Code Reference).

Auto On / Auto Off
Light points are switched on in an area when occupancy is detected and switched off after a hold time.

Manual On / Auto Off
Light points need to be switched on to task level manually on entering the room, using a manual control device such as a ZigBee Green Power (ZGP) wall switch. Upon leaving the area light points switch off after a hold time.
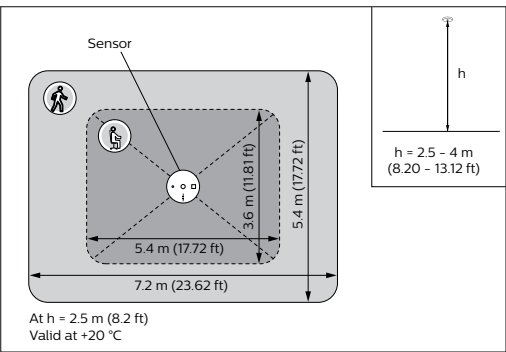
Manual On / Manual Off
Light points are controlled solely by a manual control device such as a ZigBee Green Power (ZGP) wall switch.
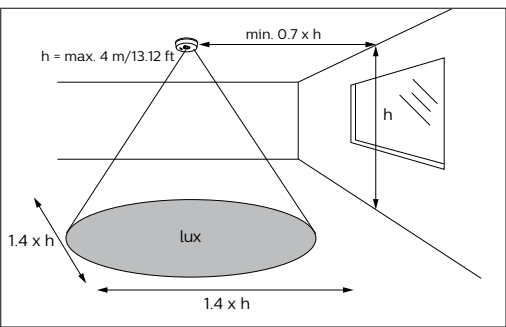
Daylight Regulation Control (DDR)
Enables detection the ingress of daylight using the multi-sensor adjusting the light output of the luminaires to maintain a chosen task level.

Note: When a behavior with daylight dependent regulation (DDR) is selected, the light points in the daylight zone must be added to a zone together with a multi-sensor to respond to the availability of daylight.

Sensor

3.6 m (11.81 ft)
5.4 m (17.72 ft)
5.4 m (17.72 ft)
7.2 m (23.62 ft)

h
h = 2.5 – 4 m
(8.20 – 13.12 ft)

At h = 2.5 m (8.2 ft)
Valid at +20 °C

Occupancy sensor field of view

min. 0.7 x h
h = max. 4 m/13.12 ft
h
1.4 x h
lux
1.4 x h

Daylight sensor field of view

Emergency Lighting

Some Interact Pro luminaires can be factory configured with generator transfer devices to allow for input from two circuits (the mains circuit and an auxiliary circuit such as a generator or central inverter system). In the event of a power failure on the mains circuit the luminaire would switch to the auxiliary circuit, and in this case the luminaire will bypass communication to and from other wireless system devices (such as sensors, switches or schedules) in order to provide full output from the luminaire.

Quick Energy Code Reference

Commercial Lighting Control Requirements.

Small/Medium Office

	ASHRAE 90.1 (2013/2016)	IECC (2018)	CA Title 24 (2016/2019)	Notes Disclaimer: This table is provided for reference only. Consult applicable code for exceptions and details.
Local / Area Control	9.4.1.1(b)	C405.2.1.1.2	130.1(a)	Remote location allowed.
Automatic Shut-off Control	9.4.1.1(h) or 9.4.1.1(i)	C405.2.1.3	130.1(c)	Shut-OFF within 20 minutes. Control zone limited to 5,000 sq. ft. Separate controls for general, display, ornamental, and display case lighting. Automatic time-switch controls may include a 2 hr. max. override (90.1/CA T24). Occ sensors required in office areas, configure so that control zone does not exceed 600 sq. ft., partial-off (reduce lights by 20%) allowed (IECC).
Dimming Control Bi-Level	9.4.1.1(d)	—	—	Provide at least one intermediate step between 30 and 70% of full lighting power or continuous dimming in addition to full ON and full OFF.
Dimming Control Light Reduction	—	C405.2.2.2	—	Required if at least one luminaire 100 watts or greater; allows the occupant to reduce the connected lighting load in a reasonably uniform illumination pattern by not less than 50 %.
Dimming Control Multi-Level Continuous	—	—	130.1(b)	Required if > 100 sq. ft. and 0.5 w / sq. ft. See Table 130.1-A. Continuous dimming of 10-100% for LED luminaires and light sources systems.
Daylight Responsive Control	9.4.1.1(f)	C405.2.3	130.1(d)	> 150 W of general lighting within sidelit zones > 150 W of general lighting within top lit zone (90.1/IECC) > 120 W of general lighting in daylit zones and total glazing area of at least 24 sq. ft. (CA T24)
Receptacle Control (Plug Load Control)	8.4.2	—	130.5(d)	Automatically control at least 50% of all 125 V, 15 and 20 amp receptacles in all private offices, conference rooms, rooms used primarily for printing and/or copying functions, break rooms to turn off within 20 minutes. All controlled receptacles shall be permanently marked to visually differentiate them from uncontrolled receptacles and are to be uniformly distributed throughout the space.
Demand Responsive Control	—	—	130.1(e) & 130.5(e) / 110.12	Applies to buildings > 10,000 sq. ft., 15% reduction taken from spaces with > 0.5 w / sq. ft. Spaces with an LPD of 0.5 w / sq. ft. or less are not required to install demand responsive controls and do not count toward the 10,000 square foot threshold.

Small/Medium Retail

	ASHRAE 90.1 (2013/2016)	IECC (2018)	CA Title 24 (2016/2019)	Notes Disclaimer: This table is provided for reference only. Consult applicable code for exceptions and details.
Local / Area Control	9.4.1.1(b)	C405.2.1.1.2	130.1(a)	Remote location allowed.
Automatic Shut-off Control	9.4.1.1(h) or 9.4.1.1(i)	C405.2.1 or C405.2.2	130.1(c)	Occ sensors or time-based scheduled control allowed in sales areas. In single tenant retail, occupancy control zone may not exceed 20,000 sq. ft. Separate controls for general, display, ornamental, and display case lighting. Automatic time-switch controls may include an override. If captive-key override is utilized, override time may exceed 2 hours.
Dimming Control Bi-Level	9.4.1.1(d)	—	—	Provide at least one intermediate step between 30 and 70% of full lighting power or continuous dimming in addition to full ON and full OFF.
Dimming Control Light Reduction	—	C405.2.2.2	—	Required if at least one luminaire 100 watts or greater; allows the occupant to reduce the connected lighting load in a reasonably uniform illumination pattern by not less than 50%.
Dimming Control Multi-Level Continuous	—	—	130.1(b)	Required if > 100 sq. ft. and 0.5 w / sq. ft. See Table 130.1-A. Continuous dimming of 10-100% for LED luminaires and light sources systems.
Daylight Responsive Control	9.4.1.1(f)	C405.2.3	130.1(d)	> 150 W of general lighting within sidelit zones (IECC), > 150 W of general lighting within top lit zone (90.1/IECC), > 120 W of general lighting in daylit zones and total glazing area of at least 24 sq. ft. (CA T24).
Receptacle Control (Plug Load Control)	—	—	—	Receptacle control not required for sales areas.
Demand Responsive Control	—	—	130.1(e) & 130.5(e) / 110.12	Applies to buildings > 10,000 sq. ft., 15% reduction taken from spaces with > 0.5 w / sq. ft. Spaces with an LPD of 0.5 w / sq. ft. or less are not required to install demand responsive controls and do not count toward the 10,000 square foot threshold.

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