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DELIVERABLE

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D6.1 Pilots Implementation:
Annex D – LISBON Pilot

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D6.1 Pilots Implementation: Annex D – LISBON Pilot

WP6:**Demonstration** (*putting into action*)

Document Control

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V4.1	03/07/2014	Revised Final Version	AGa
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V3.1	07/12/2013	Review of the final version	Pon, AGa
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V1.0	20/11/2013	First document delivered for comments and additional content.	POn

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1. Lisbon Pilot

1.1 The site

IPE, Instituto Pupilos do Exército in Lisbon, is a military educational establishment for the basic education (2nd and 3rd cycles) and Secondary Education (Vocational Education), that is developed along with of a physical activity/sports and cultural practices. The school complex is constituted by several separate buildings distributed on a large surface. Most of the buildings were built since several years.

The building selected as a Pilot for the VERYSchool project was built in 1900, has gross indoor area of 1,115 m^2, 3 floors and 10.34 m total height, with pitched roof, without attic and cellar. Structural material of the building is brickwork; building mass is heavy. North-east and north-west facades have open position, the remaining two are obscured. During the school year the building hosts an average of 91 students and 7 employees.

Part of the building, which has selected as a Pilot is situated on the ground and the first floor, and has gross indoor area of 720 m^2. Pilot is composed by classrooms, teacher's lounge, offices, computer room, library, bathrooms, hall and corridor. Pilot area hosts 98 people (both staff and students).

The need of avoiding as much as possible the wiring in the common parts, and the project review recommendation to implement at least two communication protocols, led to a decision to adopt a wireless EVO modules control network.

Item	BUILDING DATA	PILOT DATA	Item	BUILDING DATA	PILOT DATA
Gross indoor area [m^2]:	1.015,52	720,19	Gross indoor volume [m^3]:	3.453,8	2.509,06
Net indoor area [m^2]	950,29	685,2	Net indoor volume[m^3]:	3.296,87	2.448,58
Number of Building floors:	3	2	Envelope area A [m^2]:	841,22	688,2
Gross Windows surface [m^2]:	114,28	99,88	Net heated area [m^2]:	719,55	521,19
Gross floor height [m]:	3,67	3,67	Net heated space volume [m^3]:	2.496,36	1.862,49
Net floor height [m]:	3,47	3,47	Air- conditioned area [m^2]:	655,29	456,93
Total building height [m]:	10,34	7,14	Air- conditioned space volume [m^3]:	2,219	1.584,89

Building data of Lisbon School and Pilot area

The building structure

The Pilot selected building

Windows

1.2 Pilot Area Selection

The layout of the initial Pilot area is shown in the figure below. It included four small classrooms and some service rooms located at the first floor, while the first floor hosted a large library and a computer room.

Figure 1-1: layout of the initial Pilot area

Some weeks before the date established for the installation of DOKI BEMS, the School Manager informed about the decision to refurbish the building, introducing changing of the layout. This fact led to a heavy change of the BEMS performances with the need to change the design and installation due to the already production/purchase processes.

The new Pilot area, shown in the figure below, is developed on the two floors; on the ground floor are located 3 classrooms, teacher's room, employees room and a corridor, while in 1st floor find place 3 Classrooms,a bathroom, one corridor and a Computer Room.

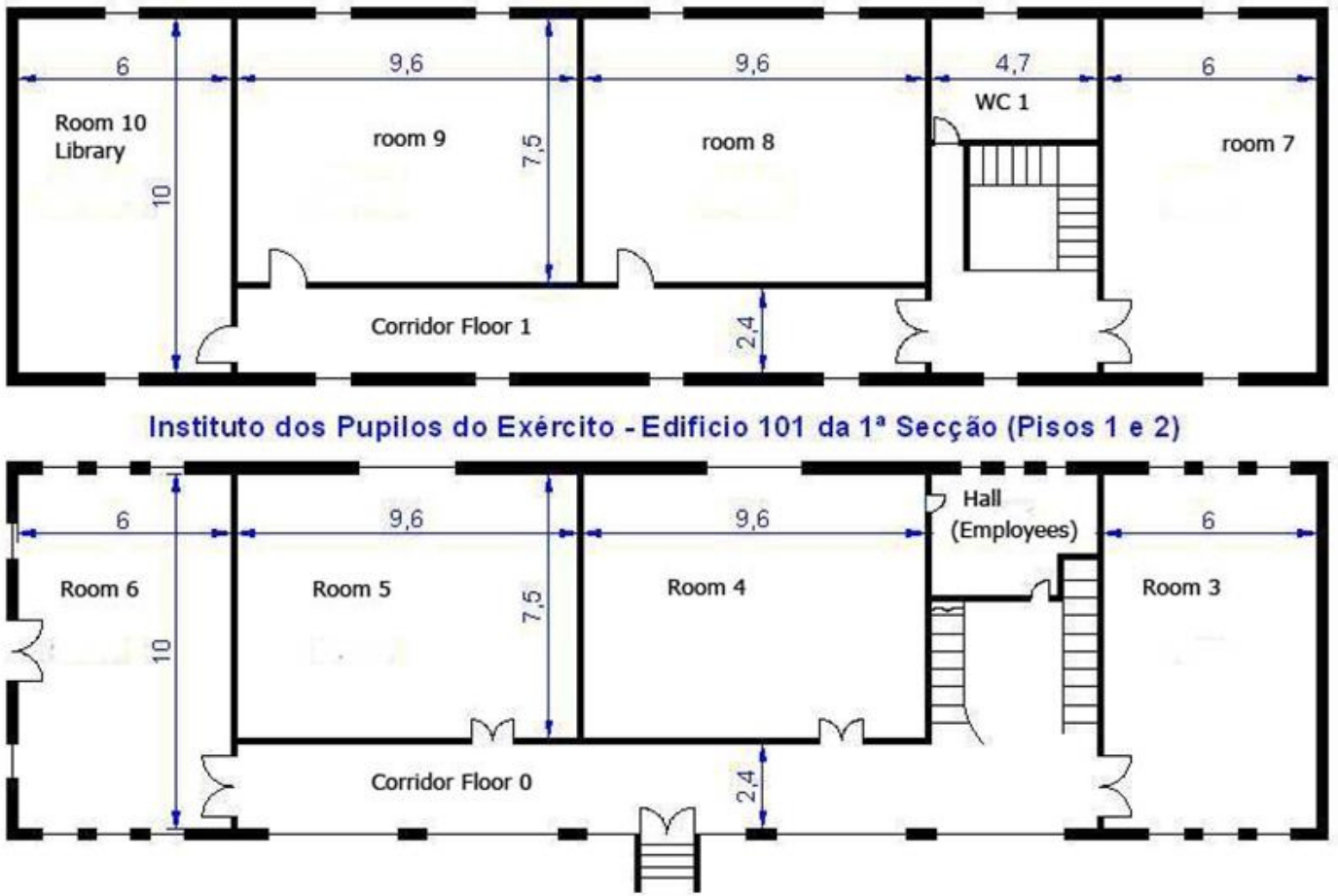


Figure 1-2: layout of the new Pilot area

1.3 Documentation of the installation

This section describes the documentation prepared for the Pilot with the objective of enabling the installer to perform the specific tasks while minimizing the possibility of errors. Moreover, the whole set of documentation details drawings, layouts, technical specification of equipment and cabling to make easy the installation by local technicians.

More in detail, the whole set of documentation includes:

1. a list of modules and units to be installed in the Pilot, including the code number of each unit;

PILOT : Lisbon	
ROOM : SYSTEM	
Bill of Material	
PC Navigator	DOKI CODE: xxxx
Monitor M12	DOKI CODE : 478301504
PC SHOT 520E	DOKI CODE : 463301603
Power Supply	DOKI CODE : 019004022
DOKIGATE	DOKI CODE : 463301601
SWITCH 1	Consumer
SWITCH 2	Consumer
Hall (Employees)	BOX DOKI 02 WI-FI DOKI CODE : 463300104
Room 3	BOX DOKI 02 WI-FI DOKI CODE : 463300104
Room 4	BOX DOKI 02 WI-FI DOKI CODE : 463300104
Room 5	BOX DOKI 02 WI-FI DOKI CODE : 463300104
Corridor (F0)	BOX DOKI 02 WI-FI DOKI CODE : 463300104
Room 6	BOX DOKI 02 WI-FI DOKI CODE : 463300104
Corridor (F1)	BOX DOKI 02 WI-FI DOKI CODE : 463300104
Room 7	BOX DOKI 02 WI-FI DOKI CODE : 463300104
Room 8	BOX DOKI 02 WI-FI DOKI CODE : 463300104
Room 9	BOX DOKI 02 WI-FI DOKI CODE : 463300104
Room 10 (Library)	BOX DOKI 02 WI-FI DOKI CODE : 463300104
Bathroom (F1)	BOX DOKI 02 WI-FI DOKI CODE : 463300104
POWER PLANT 1	BOX DOKI ENERGY PLANT WI-FI CODE : 463300105
POWER PLANT 2	BOX DOKI ENERGY PLANT WI-FI CODE : 463300105

2. a table which details the pre-configuration (done in the DOKI laboratory) for every BOX Module, including the DIP switches presets, the IP address, the ID Lisbon BOX code

BOX Label	article	Order Code	Incr	BOARD IP	WIFI IP	ID	NAME	NOME FILE	DIP 1	DIP 2	DIP 3	FW
DOKI 02 WI-FI	463300104	330577	1	10.0.1. 11	10.0.1. 201	11	Room7 (Computer)	LISBON_ Room7 (Computer)	97	1	0	2.0.5.18
DOKI 02 WI-FI	463300104	330577	2	10.0.1. 12	10.0.1. 202	12	Corridor (F0)	LISBON_ Corridor (F0)	97	2	0	2.0.5.18
DOKI 02 WI-FI	463300104	330577	3	10.0.1. 13	10.0.1. 203	13	Hall (Employees)	LISBON_ Hall (Employees)	97	3	0	2.0.5.18
DOKI 02 WI-FI	463300104	330577	6	10.0.1. 16	10.0.1. 206	16	Room 3 (teacher's Lounge)	LISBON_ Room 3 (teacher's Lounge)	97	6	0	2.0.5.18
DOKI 02 WI-FI	463300104	330577	7	10.0.1. 17	10.0.1. 207	17	4	LISBON_ 4	97	7	0	2.0.5.18
DOKI 02 WI-FI	463300104	330577	8	10.0.1. 18	10.0.1. 208	18	5	LISBON_ 5	97	8	0	2.0.5.18
DOKI 02 WI-FI	463300104	330577	10	10.0.1. 20	10.0.1. 210	20	BATHROOM (F1)	LISBON_ BATHROOM (F1)	97	10	0	2.0.5.18
DOKI 02 WI-FI	463300104	330577	12	10.0.1. 22	10.0.1. 212	22	7 (ex 10)	LISBON_ 7 (ex 10)	97	12	0	2.0.5.18
DOKI 02 WI-FI	463300104	330577	13	10.0.1. 23	10.0.1. 213	23	8 (ex 11)	LISBON_ 8 (ex 11)	97	13	0	2.0.5.18
DOKI 02 WI-FI	463300104	330577	14	10.0.1. 24	10.0.1. 214	24	9 (ex 12)	LISBON_ 9 (ex 12)	97	14	0	2.0.5.18
DOKI 02 WI-FI	463300104	330577	15	10.0.1. 25	10.0.1. 215	25	CORRIDOR(F1)	LISBON_ CORRIDOR(F1)	97	15	0	2.0.5.18
ENERGY WI-FI	463300105	330433	1	10.0.1. 26	10.0.1. 216	26	THERMAL POWER PLANT 1	LISBON_ THERMAL POWER PLANT 1	51	16	3	2.0.6.9
ENERGY WI-FI	463300105	330576	2	10.0.1. 27	10.0.1. 217	27	THERMAL POWER PLANT 2	LISBON_ THERMAL POWER PLANT 2	51	17	3	2.0.6.9
DOKI 02 WI-FI	463300104	330577	16	10.0.1.	10.0.1. 218	0	STOCK	LISBON_ STOCK	97		0	2.0.5.18

3. a general drawing which summarizes the links between the various modules of the DOKI BEMS control network, with specific details of the type of cable to use for all connections (see next session).
   Every BOX DOKI has been coupled with an IP address (Board IP and WIFI IP) and with the values of DIP Switches 1, 2 and 3 to set up the behavior of the module.
4. a wiring diagram for each EVO Module (both for control of rooms/premise and for the smart meters) that shows the connections to be performed and the type of cable to be used for each input or output.
5. a bypass diagram to each EVO Module which will allow in urgency situations switch the system to manual operation and control the lighting system.

2. The DOKI BEMS.

2.1 Layouts: control network and Box Control Units

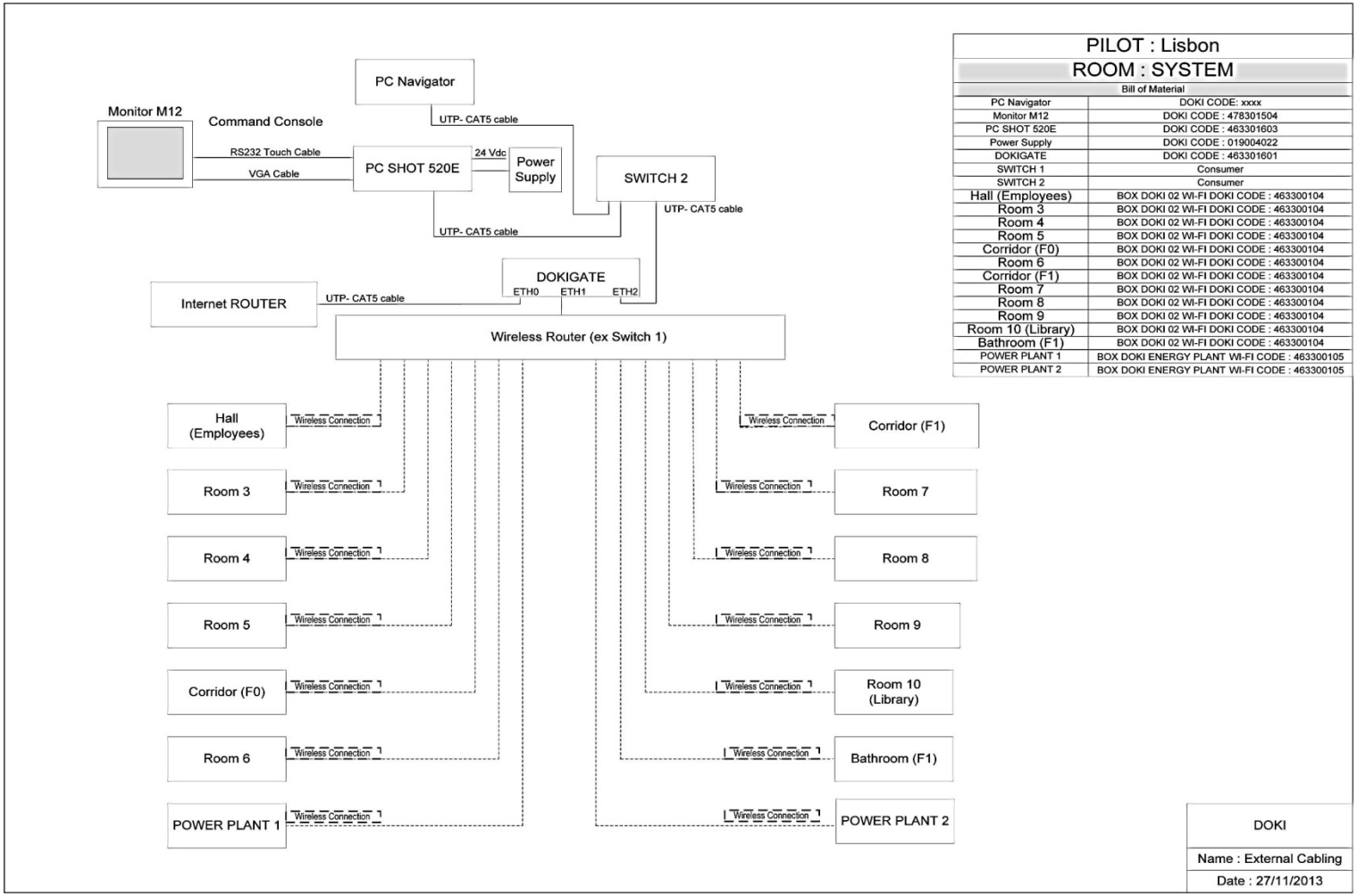


Figure 2-1: Wiring schema – Control Network

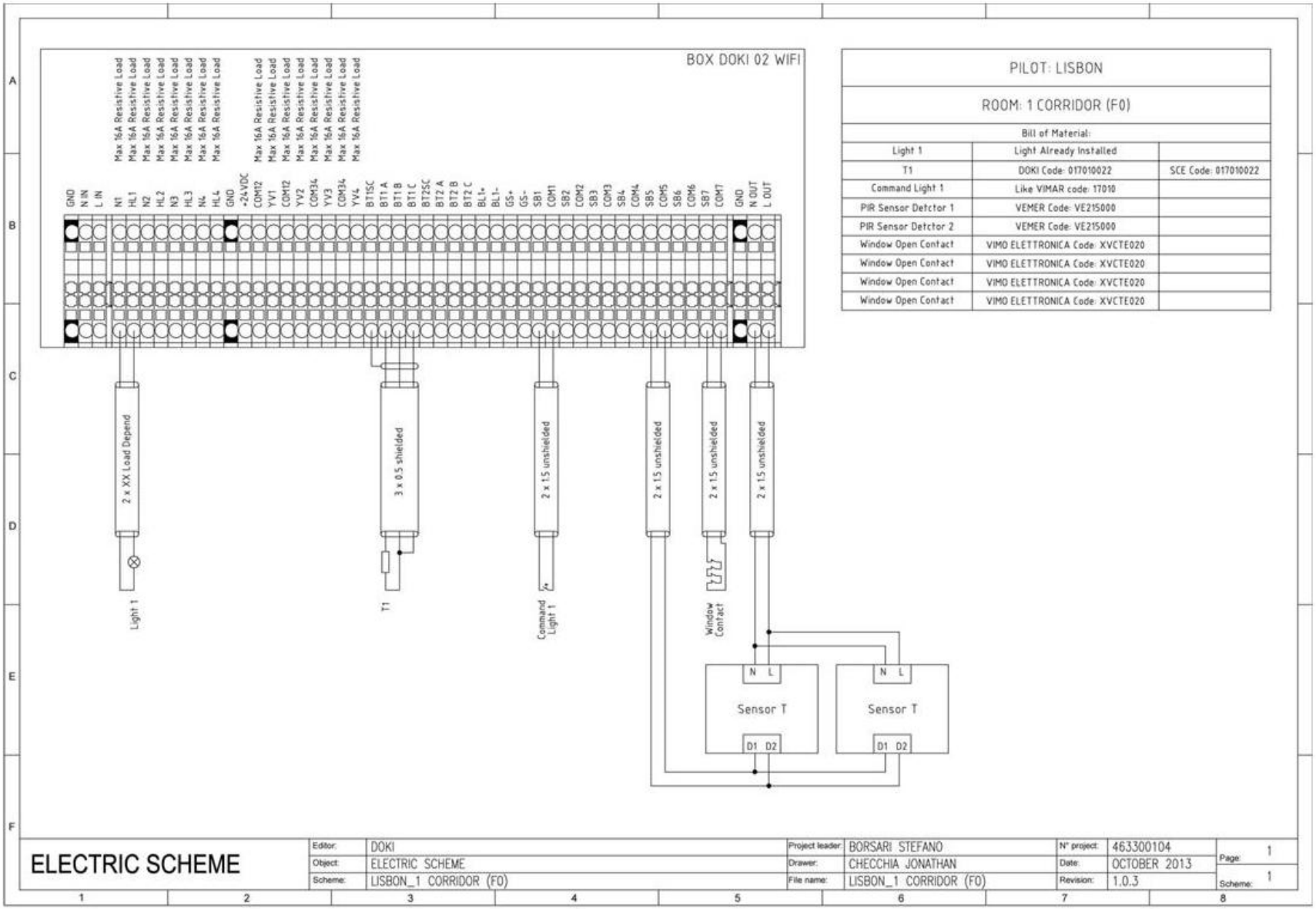


Figure 2-2: Wiring schema - Corridor (F0)

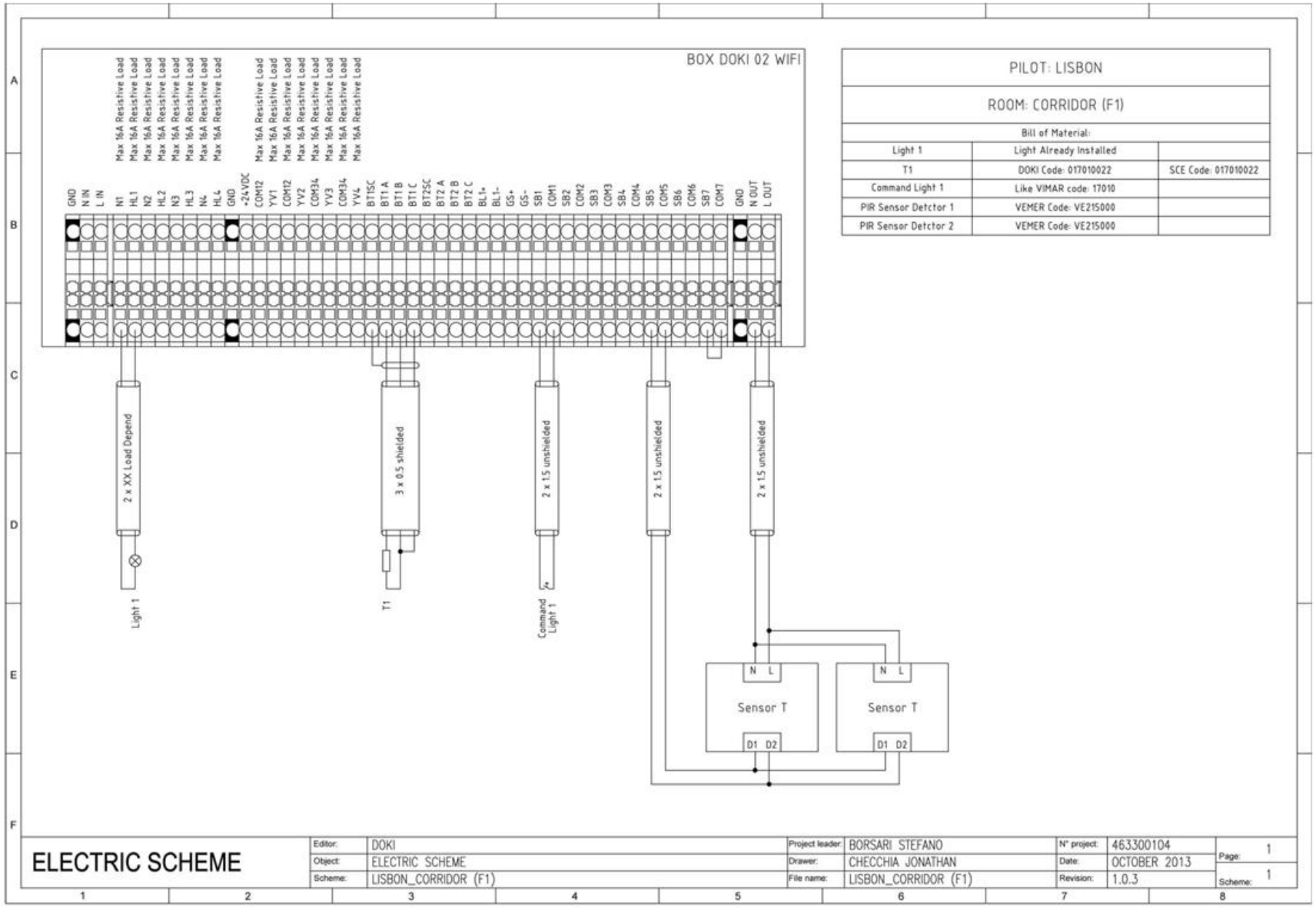


Figure 2-3: Wiring schema - Corridor (F1)

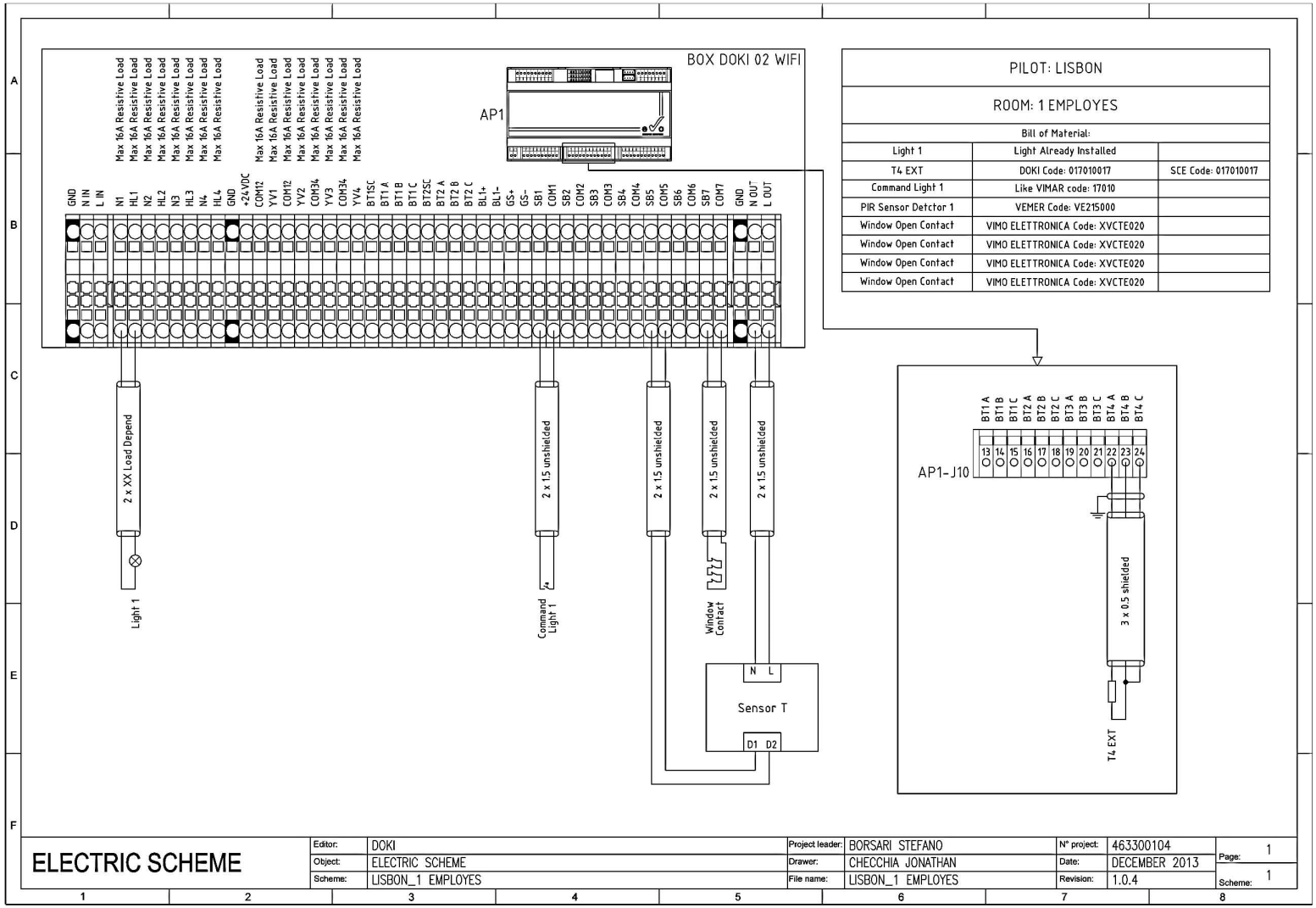


Figure 2-4: Wiring schema – Hall/Employee (F0) and ext. Temp sensor

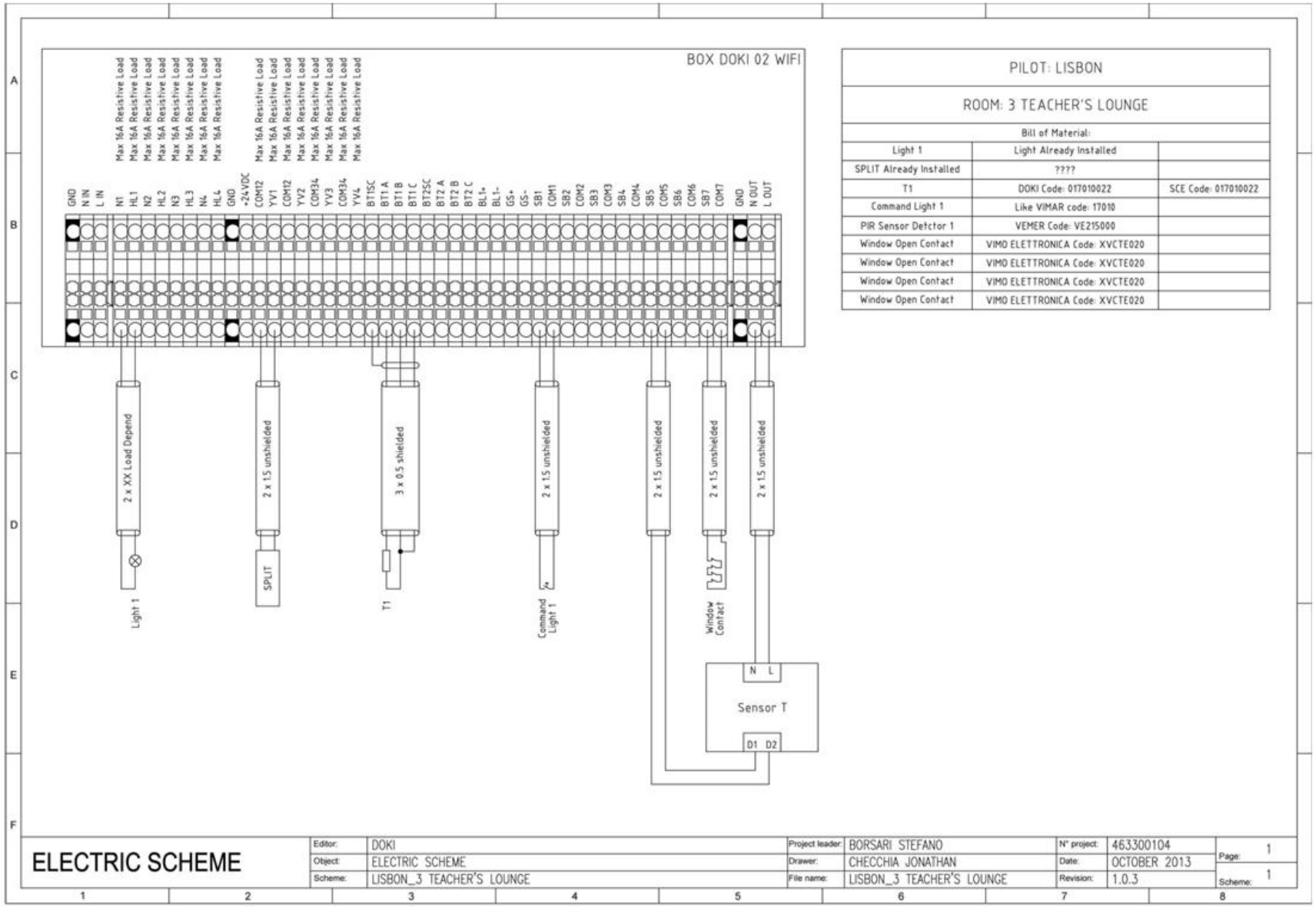


Figure 2-5: Wiring schema – Room #3 (Teacher's Lounge)

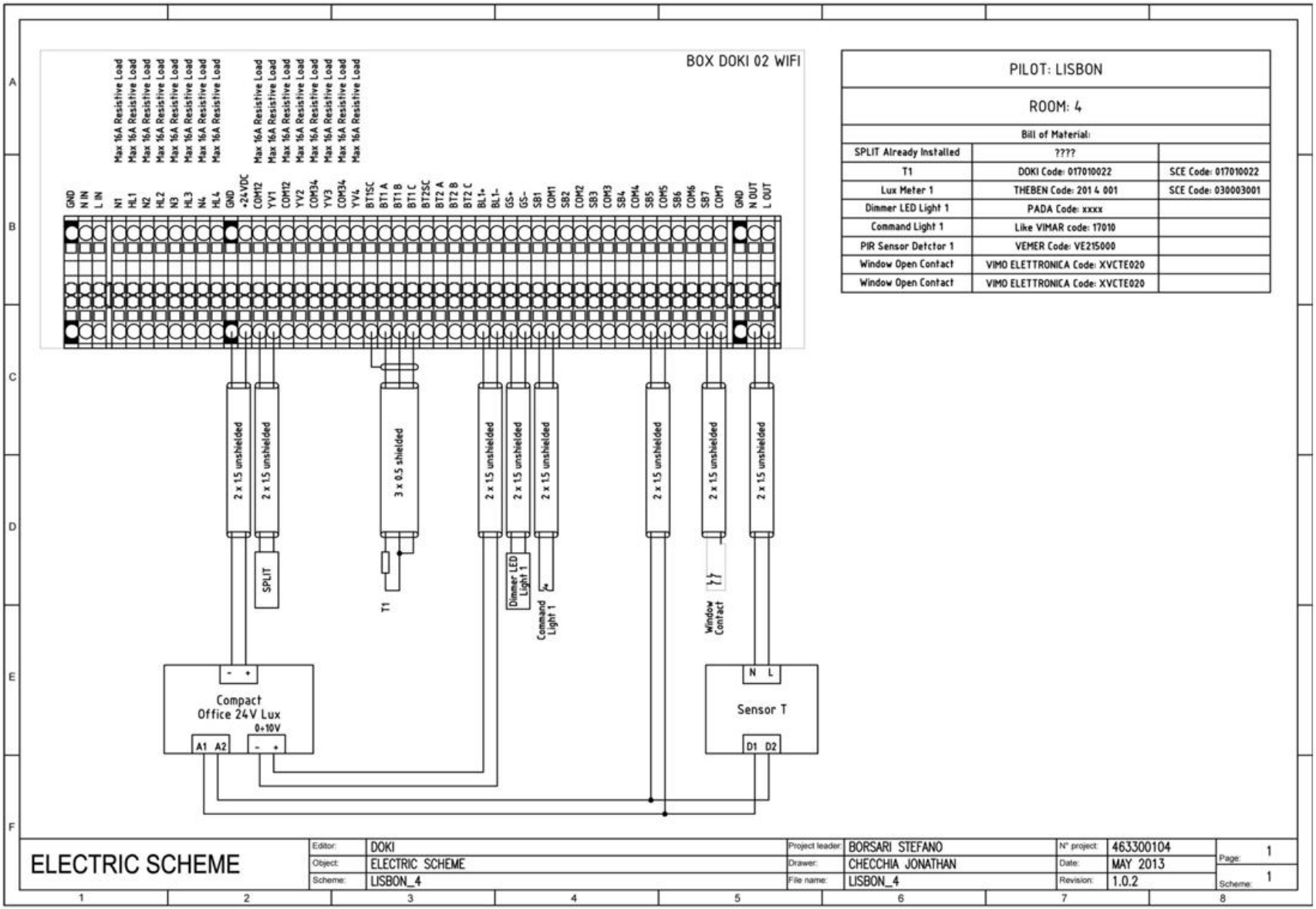


Figure 2-6: Wiring schema – Room #4

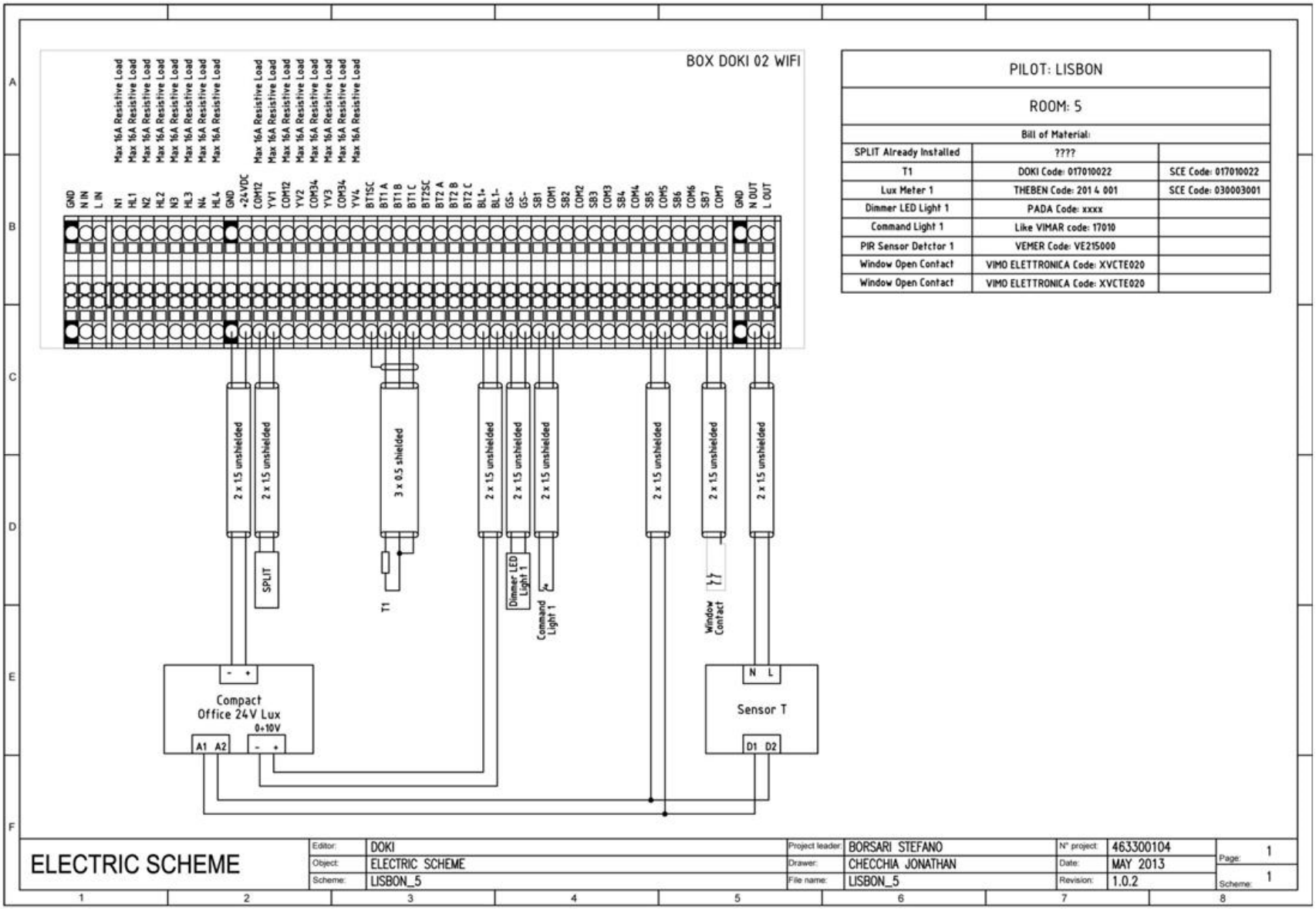


Figure 2-7: Wiring schema – Room #5

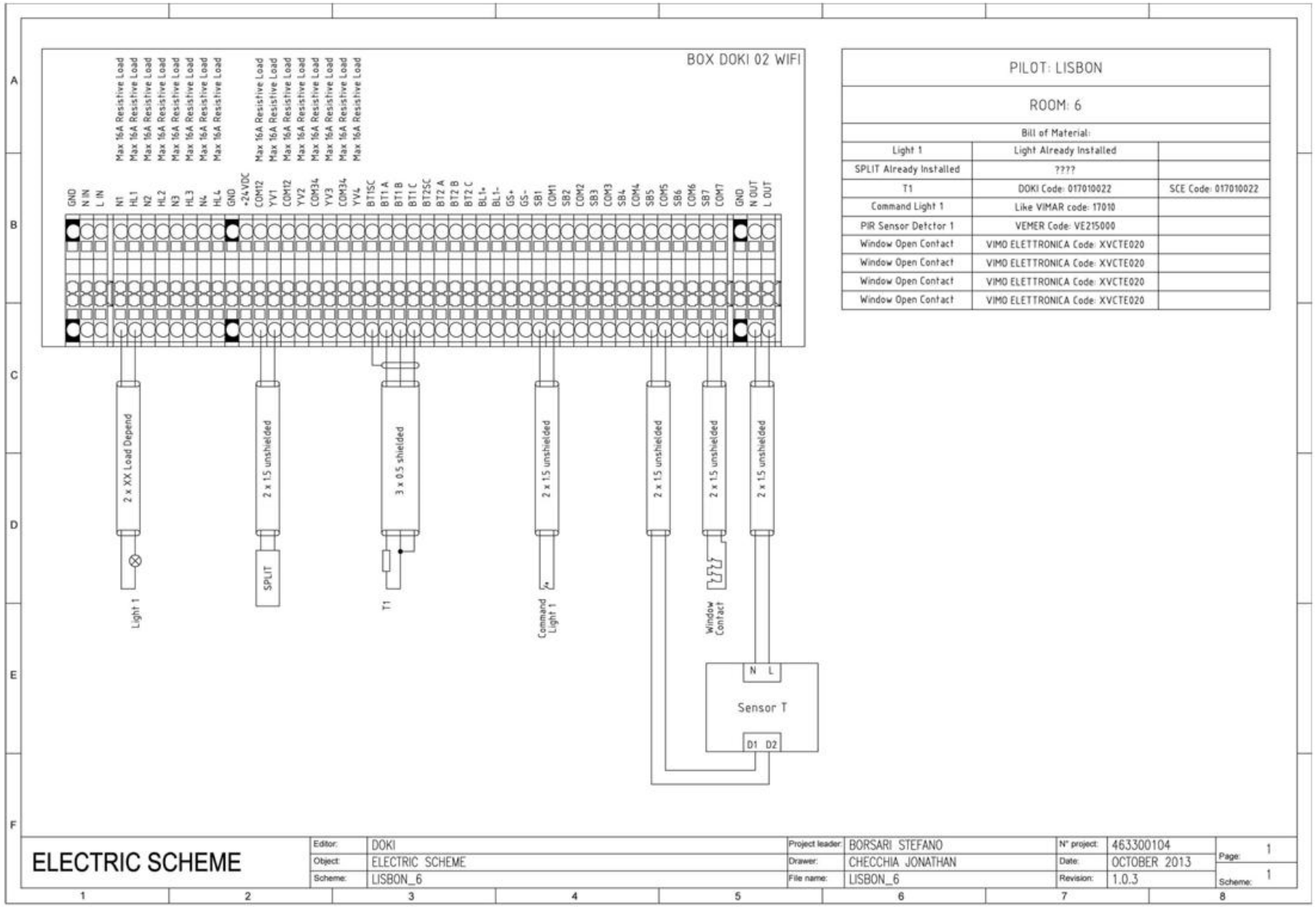


Figure 2-8: Wiring schema – Room #6

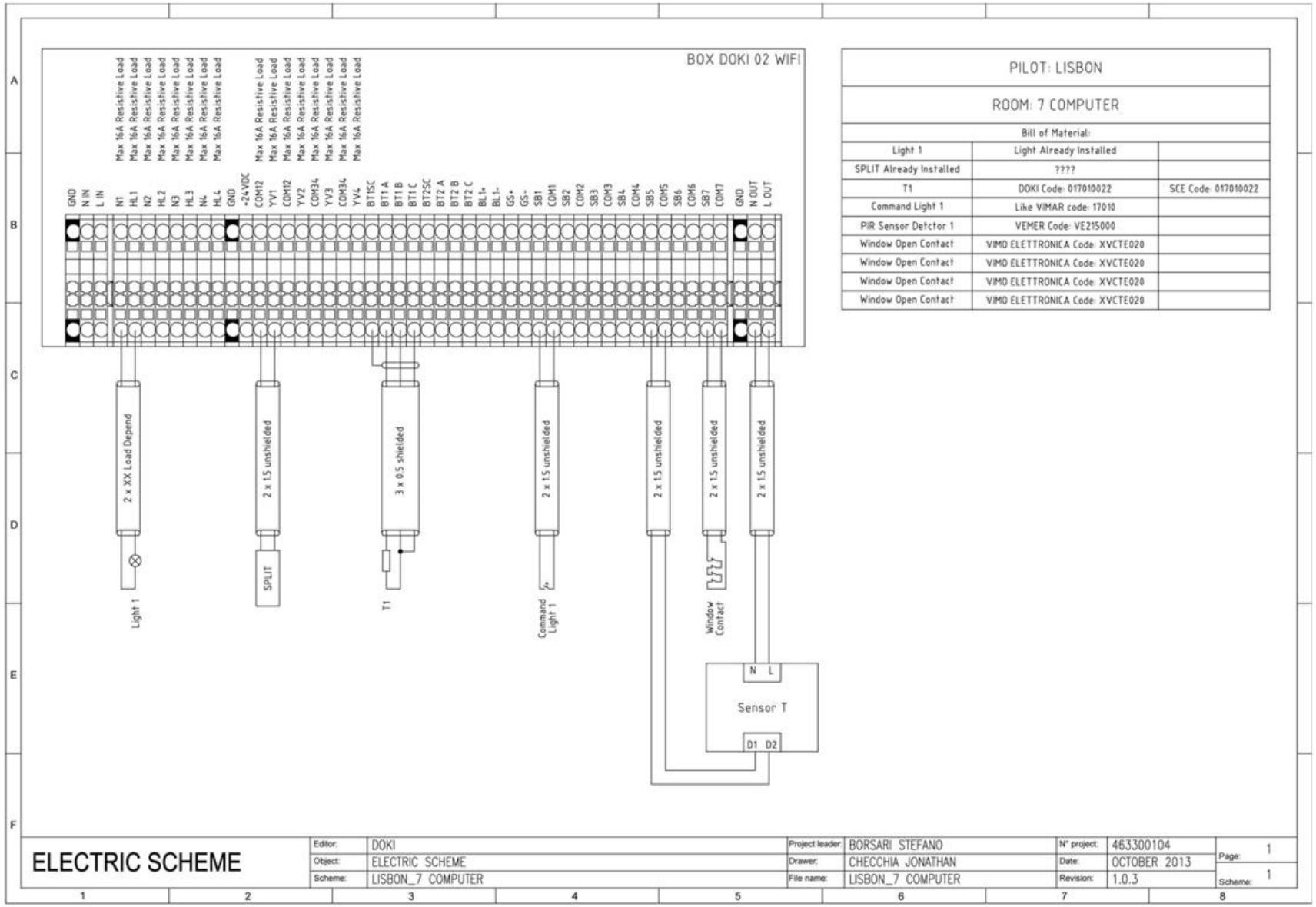


Figure 2-9: Wiring schema – Room #7 (Computer)

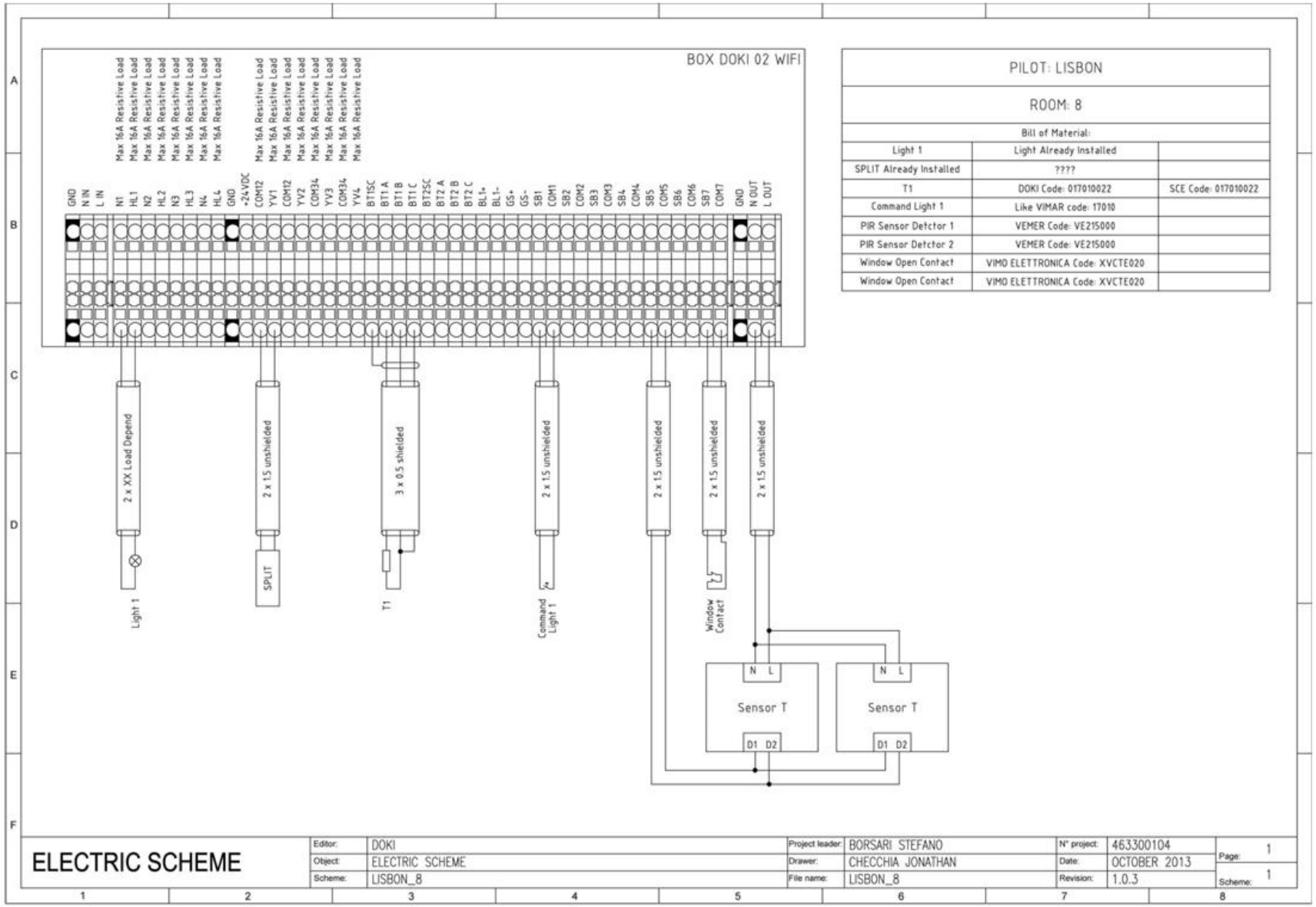


Figure 2-10: Wiring schema – Room #8

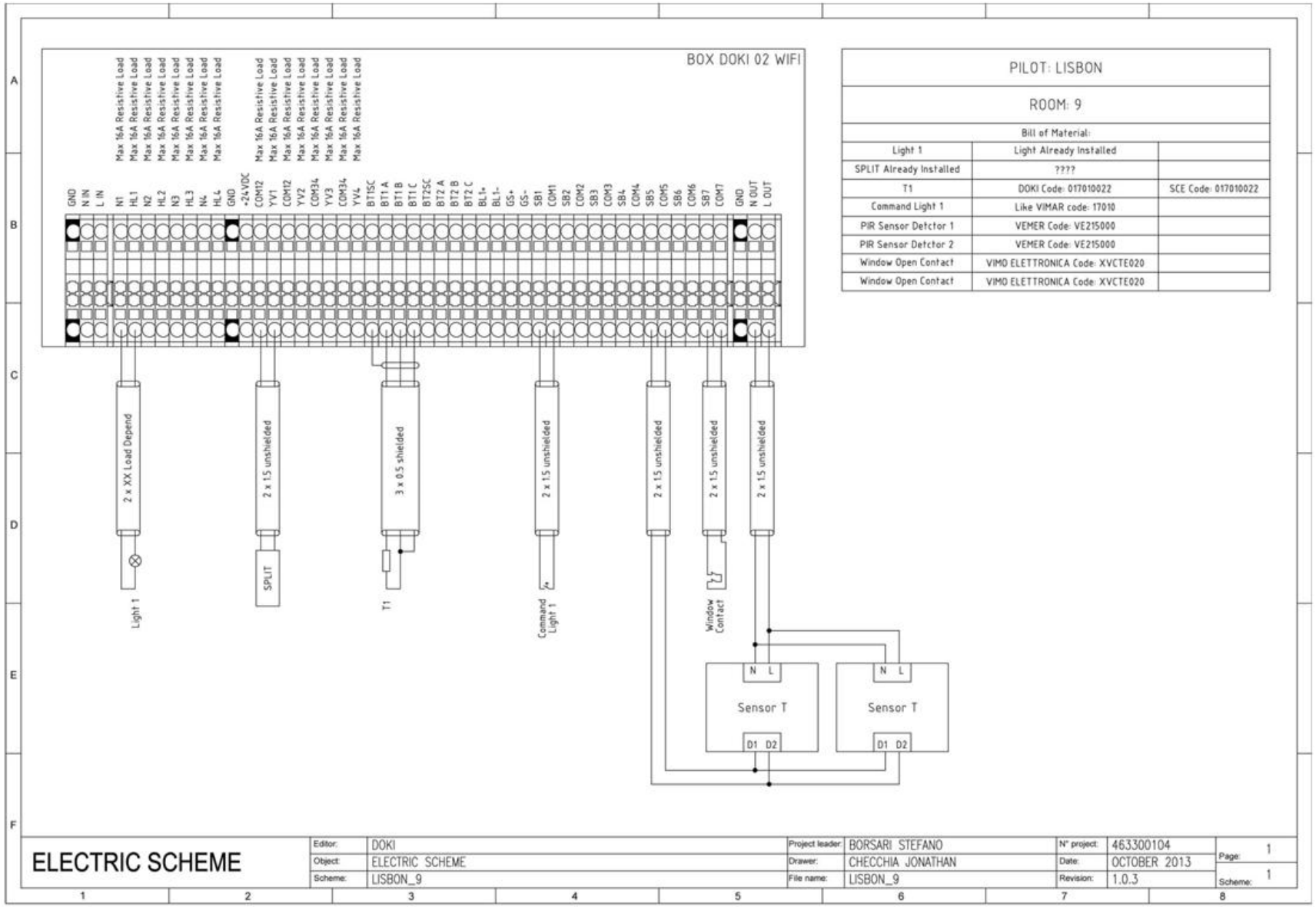


Figure 2-11: Wiring schema – Room #9

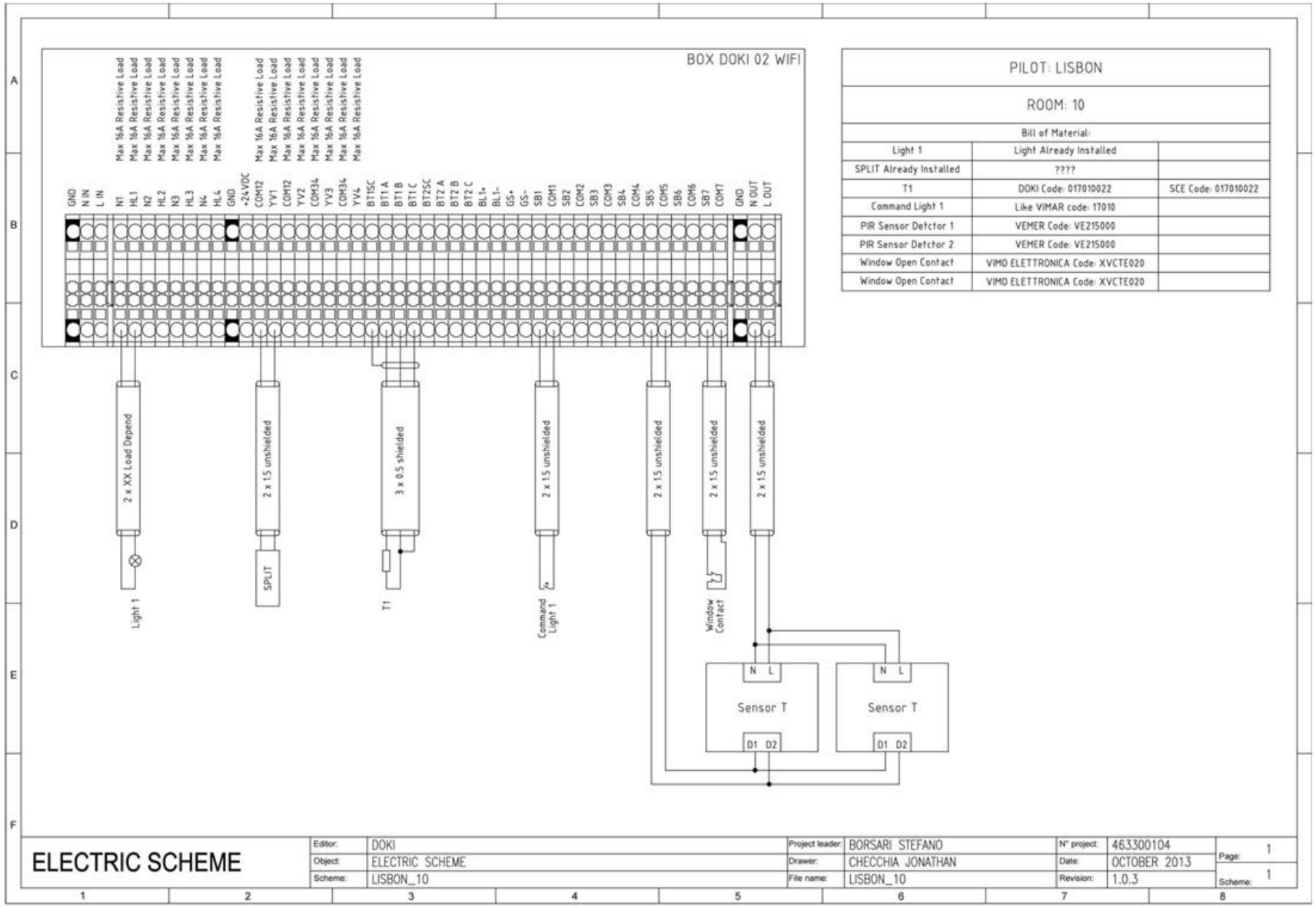


Figure 2-12: Wiring schema – Room #10

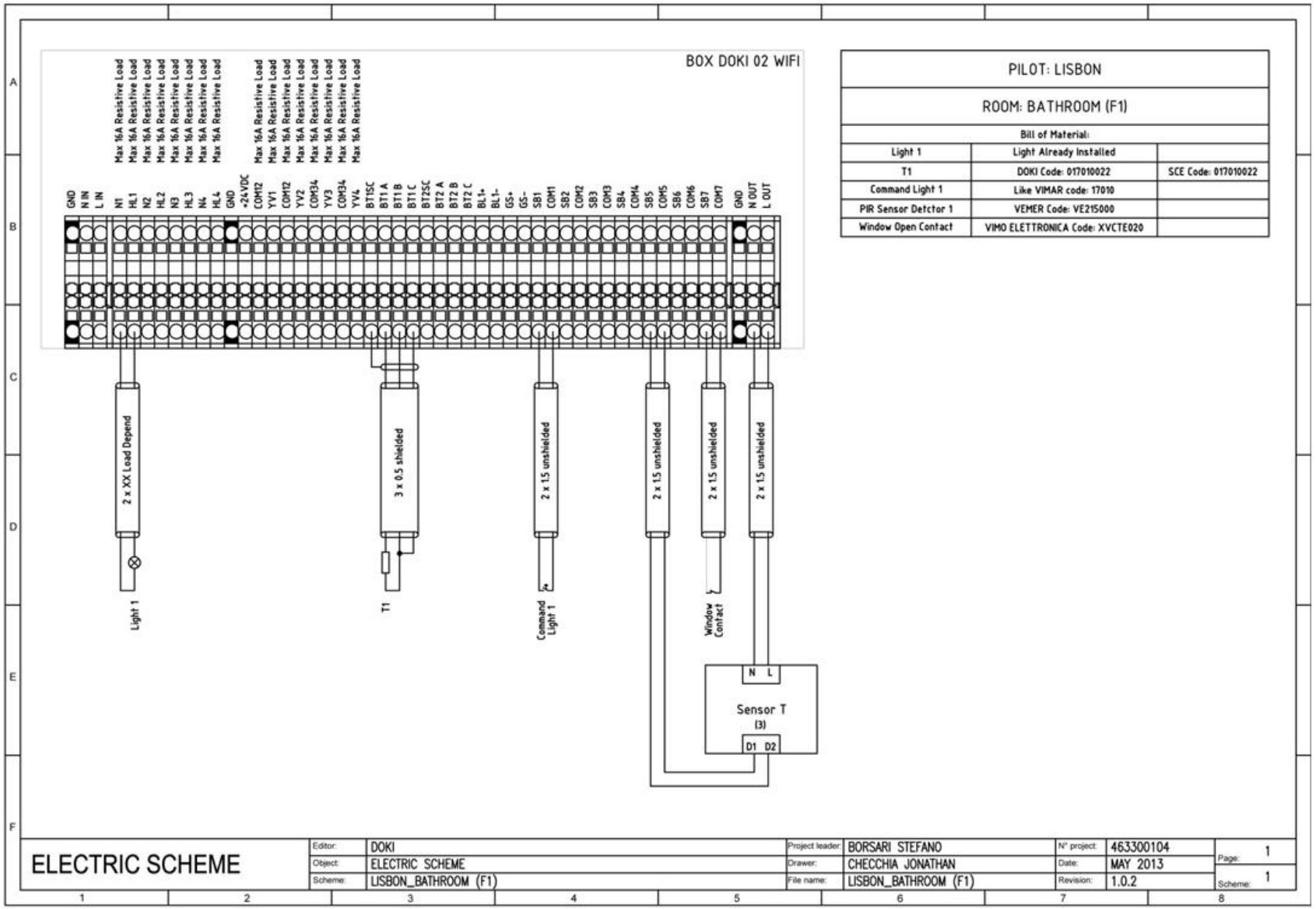


Figure 2-13: Wiring schema – Bathroom (F1)

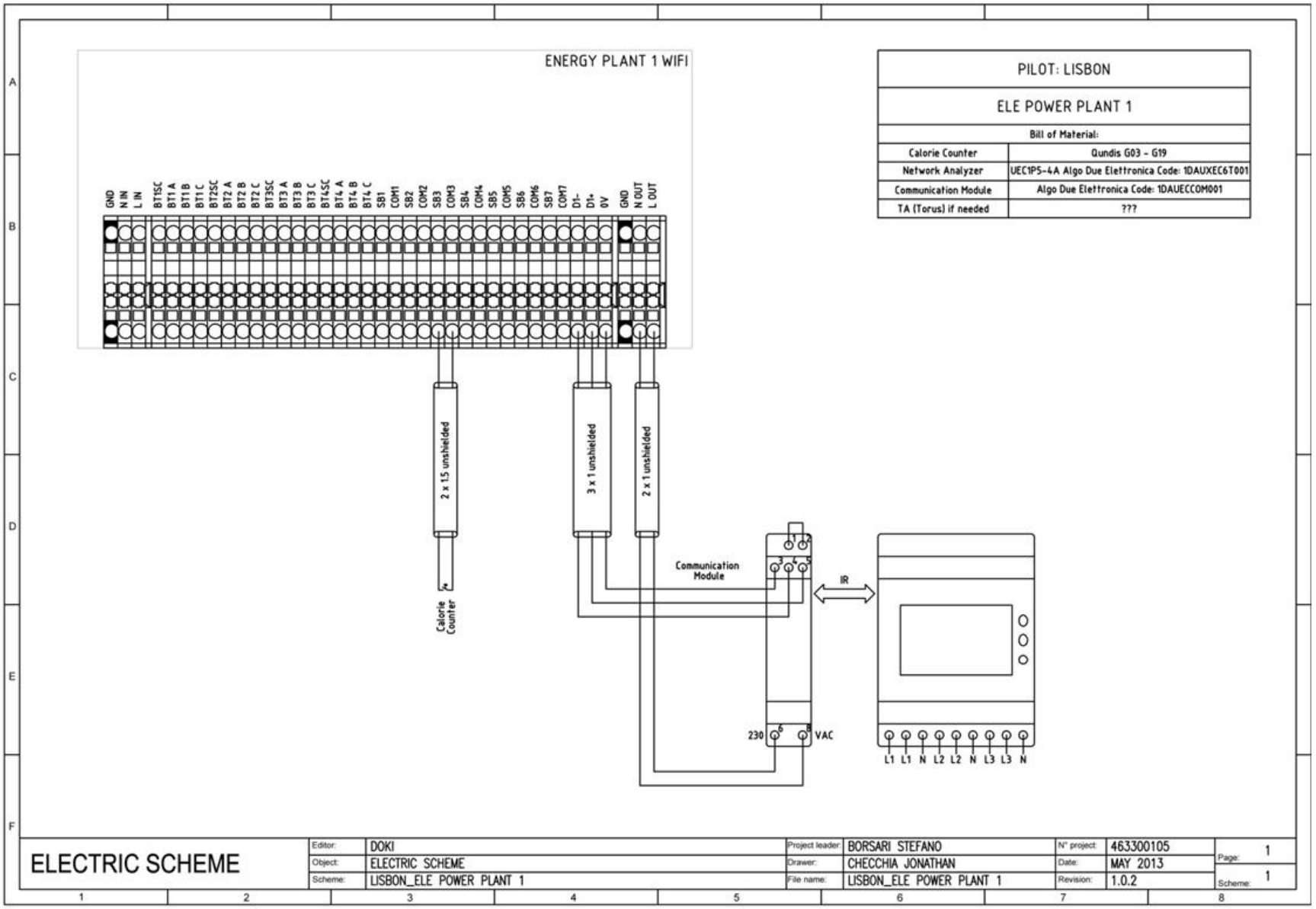


Figure 2-14: Wiring schema - smart meter (Pilot Electricity Measurement: F1)

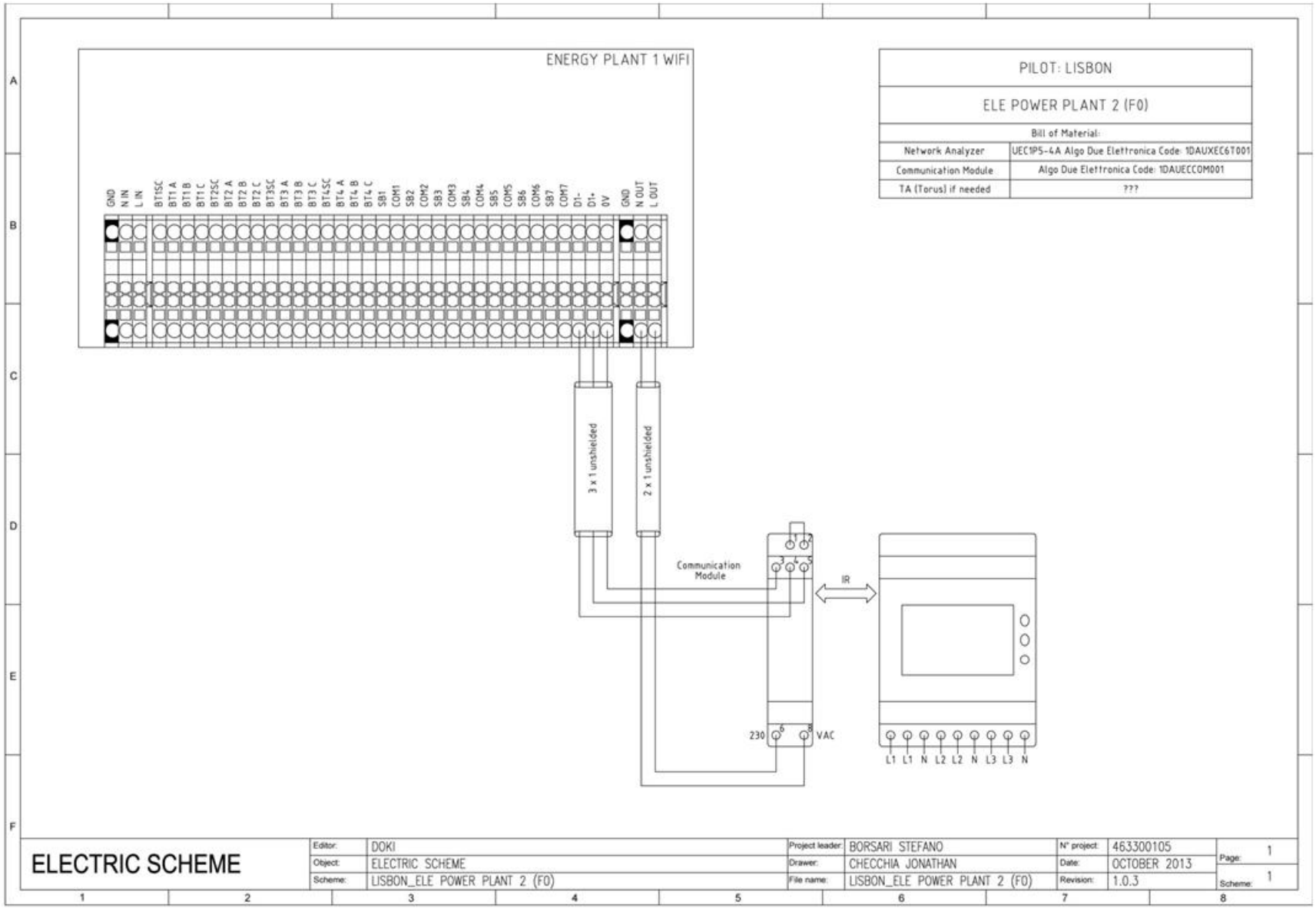


Figure 2-15: Wiring schema - Smart meter (Pilot Electricity Measurement: F0)

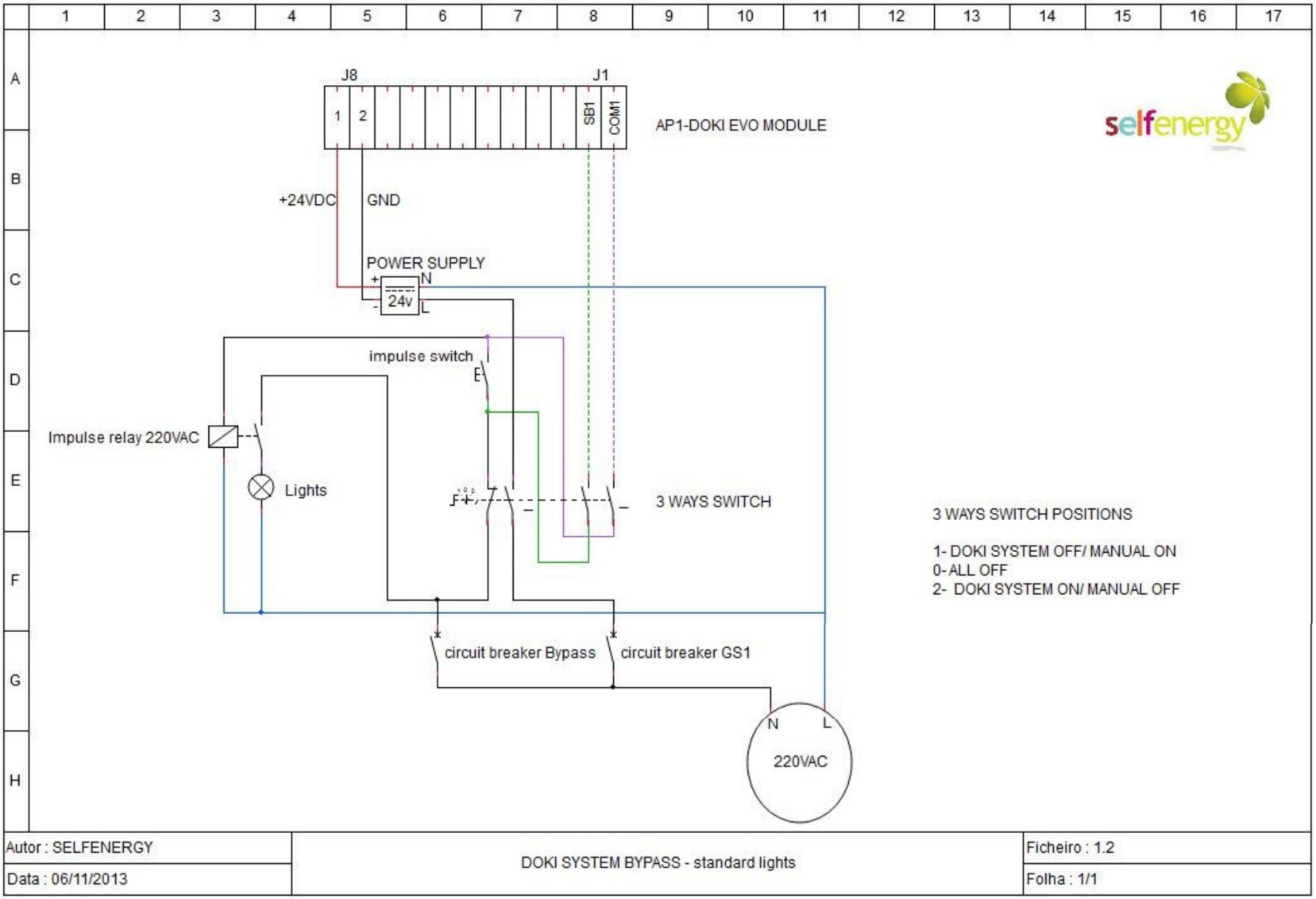


Figure 2-17: Bypass schema – manual control of the light

2.2 Summary of Installed BEMS equipment in Pilot

Name	Description	Unit	Hall	3 Teac. Lounge	C#04	C#05	Corridor F0	C#06	Corridor F1	C#07	C#08	C#09	C#10	Bathroom	ELE 1	ELE 2
Temperature sensors	internal	**12**	1	1	1	1	1	1	1	1	1	1	1	1		
	external	**1**	1													
Split contact		**8**		1	1	1		1		1	1	1	1			
Thermal meter		**1**													1	
Window contacts Groups		**23**		4	2	2		4		4	2	2	2	1		
Presence detectors	Vemer	**17**	1	1	1	1	2	1	2	1	2	2	2	1		
Presence and Luxmeter	TheBens	**2**			1	1										
LED lamps	60W	**2**				2										
LED lamps	30W	**6**			6											
LED lamps	16W	**4**				4										
Existing Lamps Groups		**10**	1	1			1	1	1	1	1	1	1	1		
Electric powerAnalyzer		**2**													1	1
DOKI UNITS		**14**	1	1	1	1	1	1	1	1	1	1	1	1	1	1

2.3 Specific points of the installation

EPro staff cooperated actively with SCE-DOKI staff along all the technical activities, facilitating choices and offering local and remote assistance.

The following **key features** have characterized the BEMS installation.

1. Lisbon Pilot was installed in a aged building, with existing plants rather olds but Pilot was refurbished during summer 2013, just a short time before installation, changing layout and the electrical network, following a decision of the School Direction.
2. The change of the building layout compelled to reformulate the preparation of materials, the lighting layout, the firmware organization of EVO Modules and in general the preparation and the organization of the materials supply and of the installation.
3. The number of rooms was reduced with respect to the initially previded plan, but the decision taken in January 2013 to use always the same basic module for all the applications helped in overcoming the difficulties of the heavy last minute changes in the Pilot structure. The remaining devices were left in place as spare parts.
4. Installation was carried out with the help of local plants specialists.

5. The external temperature sensor has been located outside near the Employyes room window and it is connected to the Control Box labeled “Hall F0” (see fig. 2-4). The sensor is seen by the Navigator as a “virtual” EVO Module.
6. Heating is previded by mobile electric oil heaters. The building prevides air conditioners to be controlled with on-off signals; nevertheless and until now, also if EVO Modules are previded for this function, no connection has been made to air conditioners because the units need some maintenance.
7. The LED technology has been considered in two classrooms for replacing exsisting fluorescent lamps: both of them are equipped with a dimming control. Quality of installation was particularly satisfactory, as wiring was hidden in the ceiling avoiding external cabling.
8. Two smart meter have been installed to perform the electricity measurement, as no heating is previded in the premises of the school: one device to measure on the ground floor and one device to measure on the first floor.
9. The smart meter on the exsisting solar plant (which feed hot water to heat the pool) was not installed as the solar plant is very old and the installation of the smart meter involved a large change in the existing system, which was incompatible with the budget of the School.The choice of using wireless interconnections between the EVO Modules helped in reducing the installation problems, beside the requirement to use at least two communication protocols in the VERYSchool project.
10. For security reasons, in this Pilot wiring has been developed considering the possibility of bypassing the operation of the EVO Modules to warranty the lights’ control also in the case of failure of the electronic devices (see Fig. 2.17)
11. All drawings have been updated and refers to the wiring actually adopted in the Pilot.

3. Web Remote Access to the SCADA PC DOME

The local interface of the Pilot is managed through a Touch Screen Display which covers the features needed for locally controlling the plant as well as for monitoring the status of each room or device. All the BEMS functionalities can also be performed remotly through an internet (web) access.

This chapter describes how to remotely connect with the DOKI BEMS and how to use, locally or remotely, all functions related to the plant management, and how the user can take vision at a glance of the status of the Pilot.

The representation of planimetry has been customized for each Pilot; it shows to the user the rooms temperature, the indoor lighting levels, energy measurement, alarms and other informations. The Lisbon planimetry shows one floor at a time: the complete representation is obtained on two screens to allow the necessary resolution. The Planimetry reports:

- The number of each room/premise;
- The actual temperature of each room in [°C];
- The actual state of the light controlled by the presence sensors:
  - green means that the room is occupied and in automatic control
  - red means that lights are switched off and there is no presence
  - yellow means that the control is disactivated and in manual control
- The actual state of every room may be investigated more in detail, using the function that shows the data of a single room on a complete screen.

3.1 Web Acces

Edit on: 02/10/2013 - Version: 1.0 - **DOME PC Network Access**

This section desribes the instructions for SCADA BEMS web log-in, in order to remotely manage the BEMS performances.

3.1.1 How to get IP address

The first thing to do is getting the Pilot IP address following the procedure below:

Type this address on your browser: http://77.93.231.138/MyHome.aspx?id=C825E2D2319E

Suggestion: save this address on your bookmark folder of your browser for a faster log-in.

The system will ask the user for a password:

PASSWORD: DOKI (This password can be changed by the PC master: configuration section => web password)

WARNING: during system configuration we recommend not to change the password to enable DOKI staff to carry out remote assistance.

Once the passoword is verified the system will automatically redirect the user to the authentication page:

User: doki

Password: dokidoki

After authentication a new window will confirm the access to the user.

NOTE: DO NOT CLOSE THE WINDOW BEFORE THE END OF SESSION

Automatically, on the main page of the browser the user will have access to the PC's web part from which he/she gets the IP address (in the address bar of your browser).

NOTE: This type of access depends on the installed PC. If the PC changes also the string to type might change.

3.1.2 Connection to the PC

There are two ways to connect to the DOKI PC:

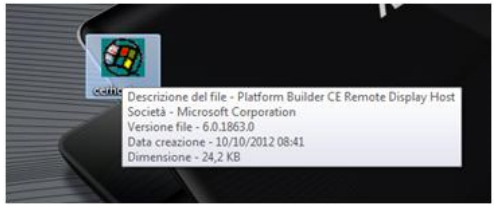
FIRST way:

type this address in the browser: http://<IPaddressobtained>:5800. This web-based connection requires Java installation (if not already available on the PC, download it from: http://www.java.com/it/download/.

It may be subject to fault network connection. (it is necessary to accept all windows security request in order to start the connection).

SECOND way:

Start **Cherhost.exe** program



Choose “File” on the new windows

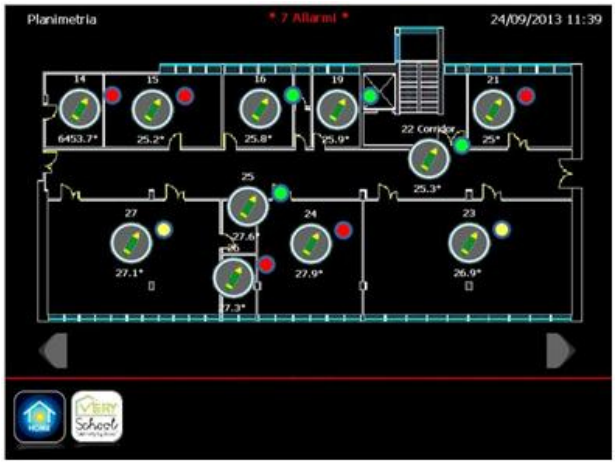
Select “connect” and type the IP address previously obtained.

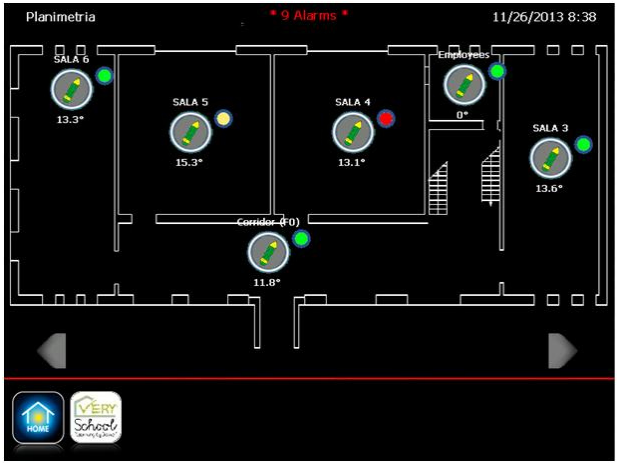
Select “OK”. In a few second the pc screen will come into view in a new windows

It is now possible to use the DOKI PC by remote. In the main screen, there are all the alarms that inform the user about malfunctioning.

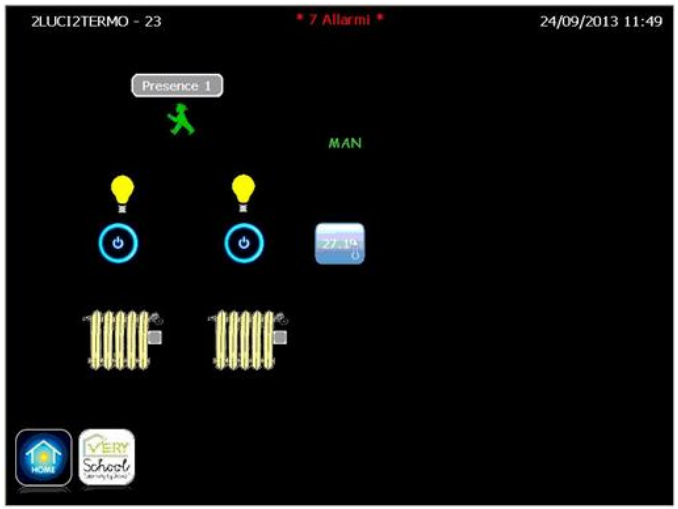
3.1.3 VerySchool key

By taping the VeryScool key  (first key on the left part of the display) the Pilot layout will be shown and the user can access the lighting and temperature management menu. The arrow on the left and on the right allow to select restricted areas.





It is possible to select the room by taping the related key. On the page that appears the user has the relevant information to manage the BEMS in a room.



By the light management menu it is possible to turn on/off the light. The lights works automatically, so we recommend NOT to change light status. See the related document.The lights can be switched on and off by pressing the power button, symbol  .
This operation will suspend the automatic working mode, therefore it is recommend not to change the light status. This function is described in the related manual.

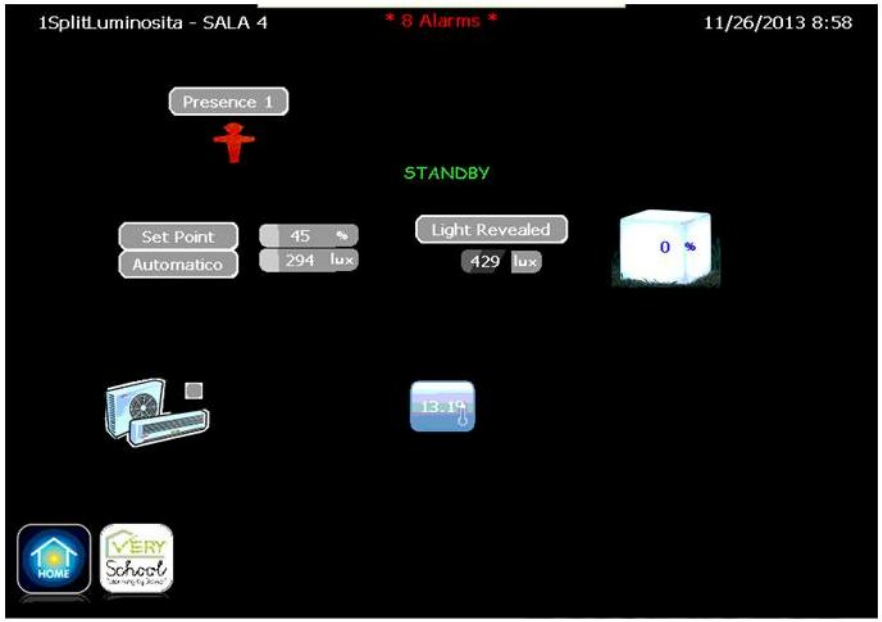
The presence sensor detects, symbol  , the room occupancy regime: green = occupancy; red = no presence.

The BEMS working mode for the selected classroom is depicted with the symbol  which can take the following operational status:
Auto = Automatic; Man = Manual; Stand-By = lighting OFF with no presence.

The lighting status of each electrical circuiti s shown with the symbol  with the following meaning: yellow = light ON, gray = light OFF.

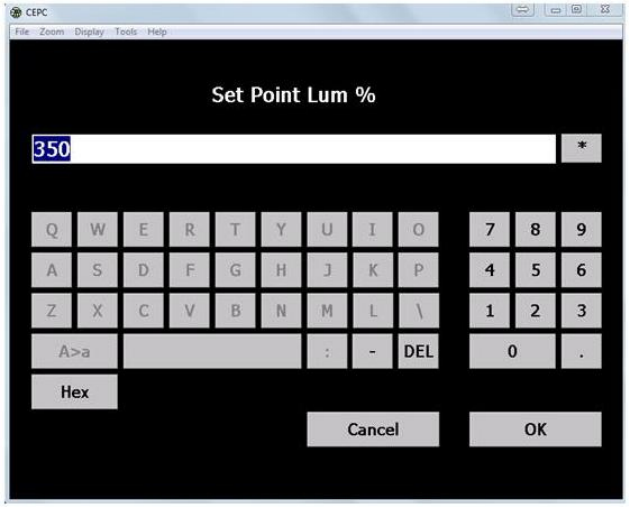
By clicing on the symbol it is possible to change the lighting status. This action, indeed, disables the automatic control (if BEMS is working on “Auto”)so it is suggested to use being aware of the consequence.

Some classrooms also have the light sensor, as in the example shown below:



The value shown in percentage represents the set point of brightness, corresponding to the number expressed in lux : in the example above, 40% corresponds to 283 lux. Each sensor has a different default values since for each of them a calibration has been performed with lab tests.

The only changable parameter is the percentage value; this is possible by clicking on its text box. Wishing to change the room set-point lighting, a window will appear with a numeric keypad (shown below) for entering the desired value.



This value is expressed in tenths of a percent. For example, to change this value the user has to write 350 to get 35%. The parameter expressing the percentage set point is that the BEMS considers to decide whether to turn on all the lights, none, or only partial.

If the lights are controlled with a dimmer, the electrical power provided to the luminaries, and consequently the light intensity, will be adjusted according to the set point and the brightness level measured by the indoor light sensor.

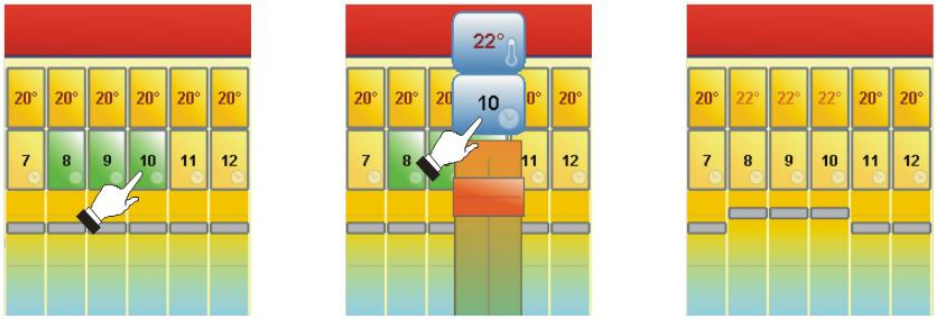
The number under the label "Light Revealed" 

is the real-time measurement [lux] within the classroom. The lightcube shows (view mode only), the percentage of lights dimming. This percentage is determined by the firmware on the basis of the automatic set point (e.g. 40% - 283 Lux), on the measured light (e.g.991 lux) and the presence (or absence) in the room.

Pushing “OK” the user confirms the changes made; pushing “Cancel” the user returns to the previous page without making any changes to the previous value.

Pushing the symbol  the user can access the temperature control menu; it implement a virtual crono-thermostat (see figure below) as calendar to programme all the 24 hours of the days in a week.

Each hour is adjustable by dragging its title bar to the top (increase temperature set point) or down (decrease temperature set point). Pressing the current day button (in the image above Wednesday) it is possible to choose the week or a single day of interest, only by using the key arrows.
Moreover, the user can select a time slot by scrolling with the cursor and the left mouse button pressed. In this way you can change all the selected time slot.
Pressing Week and Day the weekly thermostat will be changed.



To select the current season tap the following keys.

 Summer

 Winter

 OFF (Mid-season)

To change the whole week season the user must first select “Week” and then enter the desired season. The same way is to shut down the system (mid-season).

NOTE: to confirm this procedure press “OK” on the right- bottom part of the display.

3.1.4 Consumption Key

On the consumption page, by select from the main page the following keys  and on the next page  again, the user may enter the electricity consumption menu where it is possible to see the measurement of a selected smart meter, as shown in the image below.

4. List of Variables: physical measurement and High Quality Data Set

4.1 Summary Table.

Area	Item	Variables				Sensors / Hardware							
		Digital	Anologue	SW	Total	Temp	Presence	Luxmeter	Valves	Lighting Circuits	groups of radiators	Electrical Meter	Thermal meter
Class Rooms	*Room #07*	4	10	49	**63**	1	1			1			
	Room #06	4	10	49	**63**	1	1			1			
	Room #03	4	10	49	**63**	1	1			1			
	Room #04 (with LED and dimming)	3	10	70	**83**	1	1	1		1			
	Room #05 (with LED and dimming)	3	10	70	**83**	1	1	1		1			
	Room #08	4	10	49	**63**	1	1			1			
	Room #09	4	10	49	**63**	1	1			1			
	Library (Room #10)	4	10	49	**63**	1	1			1			
	Employees	3	6	37	**46**	1	1			1			
Corridors, Bath Rooms	*Corridor #01 (Ground Floor)*	3	6	37	**46**	1	1			1			
	Corridor #02 (First Floor)	3	6	37	**46**	1	1			1			
	Bathroom (First Floor)	3	6	37	**46**	1	1			1			
General	*Meteo data*	0	1	3	**4**	1							
	Pilot (Ground Floor): Electrical Measurement	0	10	24	**34**							1	
	Pilot (1st Floor): Electrical Measurement	0	10	24	**34**							1	
	School: High Quality Data Set	0	0	34	**34**								
TOTAL		***42***	**125**	**667**	**834**	**13**	**12**	**2**	**0**	**12**	**0**	**2**	**0**

Figure 4-1: summary table of physical measurement, HQDS variables and installed/controlled equipment.

4.2 Room Tables.

	Label	Room #07	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.11 - Data received by DOKI - Data Transmission = 5 minutes.
1	LICL001ALILIFLUC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	LICL001ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour.
3	LICL001ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative for the installation.
4	LICL001OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	LICL001ATIROOTEM01	Room Temperature	°C		1		1	
6	LICL001ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature: **No Heating Device**
7	LICL001RADMINVEC01	Radiator: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON: **Not Active**
8	LICL001RADMINVAM01	Radiator: Minutes ON	minutes		1		1	Cumulative in the hour: **Not Active**.
9	LICL001RADHOUVAM01	Radiator: Hours ON	hours		1		1	Cumulative from the installation: **Not Active**.
10	LICL001RADPIDORC01	Radiator: Control signal	%		1		1	**Control signal: < 50% R1 = OFF; > 50% R1 = ON - Not Active.**
11	LICL001WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
12	LICL001OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
13	LICL001RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve. **used by IES only to calibrate the building model**
14	LICL001ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				4	**10**	**0**	**14**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	LICL001ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **LICL001ALIMINLIM01** in the specific time interval
2	LICL001ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average value of **LICL001ATIROOTEM01** in the specific time interval
3	LICL001ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **LICL001ATIROOTES01** in the specific time interval. **Not Active**.
4	LICL001OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	[Number of events that **LICL001OCCPRESEM01>0**] *** 5 [minutes]** in the specific time interval
5	LICL001RADMINVAM01	Radiator (Valve): Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **LICL001RADMINVAM01** in the specific time interval. **Not Active**.
6	LICL001WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **LICL001WINWIOPEM01>0**] * 5 [minutes] in the specific time interval
7	LICL001ALIERGCLH01	Room Lighting Energy Consumption	kWh	1	1	1		**[LICL001ALIMINLIH01 * TotalWatt]/1000; TotalWatt = (6 x 2 x 36W) = 432 [Watt]**
8	LICL001ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		[**LICL001ATIROOTEH01 > LICL001ATSPTEMH01**] AND [**LICL001RADMINVAM01**>0]. **Not Active**.
9	LICL001WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**LICL001WINWIOPEM01>0** AND **LICL001RADMINVAH01>0**]. **Not Active**.
10	LICL001OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**LICL001OCCROWOWM01** <> 0] in the specific time interval
11	LICL001ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[(**LICL001ALIMINLIH01** > 0) AND (**LICL001OCCPRESEH01** = 0)] in the specific time interval
			TOTALS	**11**	**11**	**10**	**17**	
				49				

Figure 4-2: Room #7 - physical measurement and HQDS variables.

	Label	Room #06	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.15 - Data received by DOKI - Data Transmission = 5 minutes.
1	LICL002ALILIFLUC01	Lighting: Status	ON/OFF	1			**1**	0 = OFF; 1 = ON. type fluorescent
2	LICL002ALIMINLIM01	Lighting: Minutes ON	minutes		1		**1**	Cumulative in the hour.
3	LICL002ALIHOULIM01	Lighting: Hours ON	hours		1		**1**	Cumulative for the installation.
4	LICL002OCCPRESEM01	Presence Sensor	yes / no	1			**1**	0 = NO; 1 = YES
5	LICL002ATIROOTEM01	Room Temperature	°C		1		**1**	
6	LICL002ATIROOTES01	Set-Point Room Temperature	°C		1		**1**	Current Set-Point of the Room Temperature: **No Heating Device**
7	LICL002RADMINVEC01	Radiator: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON: **Not Active**
8	LICL002RADMINVAM01	Radiator: Minutes ON	minutes		1		**1**	Cumulative in the hour: **Not Active**.
9	LICL002RADHOUVAM01	Radiator: Hours ON	hours		1		**1**	Cumulative from the installation: **Not Active**.
10	LICL002RADPIDORC01	Radiator: Control signal	%		1		**1**	**Control signal: < 50% R1 = OFF; > 50% R1 = ON - Not Active.**
11	LICL002WINWIOPEM01	Windows: status	close/open	1			**1**	0 = Windows CLOSED; 1 = Windows OPENED
12	LICL002OCCROWOWM01	Room Control Status	-		1		**1**	**0 = automatic; 1 = manual; 2 = stand-by.**
13	LICL002RADTHRADS01	Threshold Radiator 1	%		1		**1**	Set-Point to switch ON/OFF Valve. **used by IES only to calibrate the building model**
14	LICL002ALIWAITIT01	Waiting Time	minutes		1		**1**	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				4	**10**	**0**	**14**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	LICL002ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	**3**	ABS (last value - first value) of **LICL002ALIMINLIM01** in the specific time interval
2	LICL002ATIROOTEH01	Room Temperature	°C	1	1	1	**3**	Average value of **LICL002ATIROOTEM01** in the specific time interval
3	LICL002ATISPTEMH01	Set-Point Room Temperature	°C	1	1		**2**	Last value of **LICL002ATIROOTES01** in the specific time interval. **Not Active**.
4	LICL002OCCPRESEH01	Presence Sensor	minutes	1	1	1	**3**	[Number of events that **LICL002OCCPRESEM01>0**] *** 5 [minutes]** in the specific time interval
5	LICL002RADMINVAM01	Radiator (Valve): Minutes ON	minutes	1	1	1	**3**	ABS (last value - first value) of **LICL002RADMINVAM01** in the specific time interval. **Not Active**.
6	LICL002WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	**3**	[Number of events that **LICL002WINWIOPEM01>0**] * 5 [minutes] in the specific time interval
7	LICL002ALIERGCOH01	Room Lighting Energy Consumption	kWh	1	1	1		**[LICL002ALIMINLIH01 * TotalWatt]/1000; TotalWatt = (6 x 4 x 18W) = 432 [Watt];**
8	LICL002ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		[**LICL002ATIROOTEH01 > LICL002ATSPTEMH01**] AND [**LICL002RADMINVAM01**>0]. **Not Active**.
9	LICL002WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**LICL002WINWIOPEM01>0** AND **LICL002RADMINVAH01>0**]. **Not Active**.
10	LICL002OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**LICL002OCCROWOWM01** <> 0] in the specific time interval
11	LICL002ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[(**LICL002ALIMINLIH01** > 0) AND (**LICL002OCCPRESEH01** = 0)] in the specific time interval
			TOTALS	**11**	**11**	**10**	**17**	
				49				

Figure 4-3: Room #6 - physical measurement and HQDS variables.

	Label	Room #03	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.16 - Data received by DOKI - Data Transmission = 5 minutes.
1	LICL003ALILIFLUC01	Lighting: Status	ON/OFF	1			**1**	0 = OFF; 1 = ON. type fluorescent
2	LICL003ALIMINLIM01	Lighting: Minutes ON	minutes		1		**1**	Cumulative in the hour.
3	LICL003ALIHOULIM01	Lighting: Hours ON	hours		1		**1**	Cumulative for the installation.
4	LICL003OCCPRESEM01	Presence Sensor	yes / no	1			**1**	0 = NO; 1 = YES
5	LICL003ATIROOTEM01	Room Temperature	°C		1		**1**	
6	LICL003ATIROOTES01	Set-Point Room Temperature	°C		1		**1**	Current Set-Point of the Room Temperature: **No Heating Device**
7	LICL003RADMINVEC01	Radiator: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON: **Not Active**
8	LICL003RADMINVAM01	Radiator: Minutes ON	minutes		1		**1**	Cumulative in the hour: **Not Active**.
9	LICL003RADHOUVAM01	Radiator: Hours ON	hours		1		**1**	Cumulative from the installation: **Not Active**.
10	LICL003RADPIDORC01	Radiator: Control signal	%		1		**1**	**Control signal: < 50% R1 = OFF; > 50% R1 = ON - Not Active.**
11	LICL003WINWIOPEM01	Windows: status	close/open	1			**1**	0 = Windows CLOSED; 1 = Windows OPENED
12	LICL003OCCROWOWM01	Room Control Status	-		1		**1**	**0 = automatic; 1 = manual; 2 = stand-by.**
13	LICL003RADTHRADS01	Threshold Radiator 1	%		1		**1**	Set-Point to switch ON/OFF Valve. **used by IES only to calibrate the building model**
14	LICL003ALIWAITIT01	Waiting Time	minutes		1		**1**	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				4	**10**	**0**	**14**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	LICL003ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	**3**	ABS (last value - first value) of **LICL003ALIMINLIM01** in the specific time interval
2	LICL003ATIROOTEH01	Room Temperature	°C	1	1	1	**3**	Average value of **LICL003ATIROOTEM01** in the specific time interval
3	LICL003ATISPTEMH01	Set-Point Room Temperature	°C	1	1		**2**	Last value of **LICL003ATIROOTES01** in the specific time interval. **Not Active**.
4	LICL003OCCPRESEH01	Presence Sensor	minutes	1	1	1	**3**	[Number of events that **LICL003OCCPRESEM01>0**] *** 5 [minutes]** in the specific time interval
5	LICL003RADMINVAM01	Radiator (Valve): Minutes ON	minutes	1	1	1	**3**	ABS (last value - first value) of **LICL003RADMINVAM01** in the specific time interval. **Not Active**.
6	LICL003WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	**3**	[Number of events that **LICL003WINWIOPEM01>0**] * 5 [minutes] in the specific time interval
7	LICL003ALIERGCOH01	Room Lighting Energy Consumption	kWh	1	1	1		**[LICL003ALIMINLIH01 * TotalWatt]/1000; TotalWatt = (6 x 2 x 36W) = 432 [Watt]**
8	LICL003ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		[**LICL003ATIROOTEH01 > LICL003ATSPTEMH01**] AND [**LICL003RADMINVAM01**>0]. **Not Active**.
9	LICL003WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**LICL003WINWIOPEM01>0** AND **LICL003RADMINVAH01>0**]. **Not Active**.
9	LICL003OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**LICL003OCCROWOWM01** <> 0] in the specific time interval
10	LICL003ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[(**LICL003ALIMINLIH01** > 0) AND (**LICL003OCCPRESEH01** = 0)] in the specific time interval
			TOTALS	**11**	**11**	**10**	**17**	
				49				

Figure 4-4: Room #3 - physical measurement and HQDS variables.

	Label	Room #04 (with LED & dimming)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.17 - Data received by DOKI - Data Transmission = 5 minutes.
1	LICL004ALIOLPIDD01	Lighting: Control signal	volt		1		**1**	**PID regolation output 0÷10 [volt]. Light Status: ON if LICL004ALIOLPIDD01>0; OFF if LICL004ALIOLPIDD01=0.**
2	LICL004ALIBLRROM01	Room Brightness	lux		1		**1**	Brightness measurement.
3	LICL004ALISPBLRS01	Set Point Room Brightness	lux		1		**1**	Brightness Setpoint
4	LICL004OCCPRESEM01	Presence Sensor	yes / no	1			**1**	Status ON/OFF.
5	LICL004ATIROOTEM01	Room Temperature	°C		1		**1**	
6	LICL004ATIROOTES01	Set-Point Room Temperature	°C		1		**1**	Current Set-Point of the Room Temperature: **No Heating Device**
7	LICL004RADMINVEC01	Radiator: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON: **Not Active**
8	LICL004RADMINVAM01	Radiator: Minutes ON	minutes		1		**1**	Cumulative in the hour: **Not Active.**
9	LICL004RADHOUVAM01	Radiator: Hours ON	hours		1		**1**	Cumulative from the installation: **Not Active**.
10	LICL004RADPIDORC01	Radiator: Control signal	%		1		**1**	**Control signal: < 50% R1 = OFF; > 50% R1 = ON - Not Active.**
11	LICL004WINWIOPEM01	Windows: status	close/open	1			**1**	0 = Windows CLOSED; 1 = Windows OPENED
12	LICL004OCCROWOWM01	Room Control Status	-		1		**1**	**0 = automatic**; **1 = manual**; **2 = stand-by**.
13	LICL004RADTHRADS01	Threshold Radiator 1	%		1		**1**	Set-Point to switch ON/OFF Valve. **used by IES only to calibrate the building model**
14	LICL004ALIWAITIT01	Waiting Time	minutes		1		**1**	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				3	**10**	**0**	**13**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	LICL004ALILILEDH01	Lighting: Control signal	volt	1	1	1	**3**	Average among all value of **LICL004ALIOLPIDD01** in the specific time interval
2	LICL004ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	**3**	**[Number of Events that LICL004ALIOLPIDD01>0] * 5 [minutes]**, in the specific interval
3	LICL004ALIBLRROH01	Room Brightness	Lux	1	1	1	**3**	Average among all values of **LICL004ALIBLRROM01** in the specific time interval
4	LICL004ALISPBLRH01	Set Point Room Brightness	lux	1	1	1	**3**	Last value of **LICL004ALISPBLRS01** in the specific time interval
5	LICL004ATIROOTEH01	Room Temperature	°C	1	1	1	**3**	Average among all values of **LICL004ATIROOTEM01** in the specific time interval
6	LICL004ATISPTEMH01	Set-Point Room Temperature	°C	1	1		**2**	Last value of **LICL004ATIROOTES01** in the specific time interval. **Not Active**.
7	LICL004OCCPRESEH01	Presence Sensor	minutes	1	1	1	**3**	[Number of events that **LICL004OCCPRESEM01 > 0**] *** 5 [minutes]**, in the specific time interval
8	LICL004RADMINVAM01	Radiator (Valve): Minutes ON	minutes	1	1	1	**3**	ABS (last value - first value) of **LICL004RADMINVAM01** in the specific time interval. Not Active.
9	LICL004WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	**3**	[Number of events that **LICL004WINWIOPEM01 > 0**] * 5 [minutes], in the specific time interval
10	LICL004ALIERGCOH01	Room Lighting Energy Consumption	kWh	1	1	1		**[LICL004ALIMINLIH01 * (LICL004ALILIFLUH01/10) * TotalWatt]/1000; TotalWatt = (6 x 30W) = 180 [Watt]**
11	LICL004ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		[**LICL004ATIROOTEM01 > LICL004ATIROOTEM01**] AND [**LICL004RADMINVAH01>0**]
12	LICL004ATILHTSPH01	"Luxamb > Set-point & Light ON"	events	1	1	1		[**LICL004ALIBLRROM01** > **LICL004ALISPBLRS01**] AND [**LICL004ALIOLPIDD01>0**]
13	LICL004WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**LICL004WINWIOPEH01>0** AND **LICL004RADMINVAH01>0**]
14	LICL004OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**LICL004OCCROWOWM01 <> 0**] in the specific time interval
15	LICL004ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[**LICL004ALIMINLIH01>0**] AND [**LICL004OCCPRESEM01=0**] in the specific time interval
			TOTALS	**15**	**15**	**14**	**26**	
				70				

Figure 4-5: Room #4 - physical measurement and HQDS variables.

	Label	Room #05 (with LED & dimming)	Unit	Dig	Ang	SW	TOTAL	EVO (control module) IP address: 10.0.1.18 - Data received by DOKI - Data Transmission = 5 minutes.
1	LICL005ALIOLPIDD01	Lighting: Control signal	volt		1		1	**PID regolation output 0÷10 [volt]. Light Status: ON if LICL005ALIOLPIDD01>0; OFF if LICL005ALIOLPIDD01=0.**
2	LICL005ALIBLRROM01	Room Brightness	lux		1		1	Brightness measurement.
3	LICL005ALISPBLRS01	Set Point Room Brightness	lux		1		1	Brightness Setpoint
4	LICL005OCCPRESEM01	Presence Sensor	yes / no	1			1	Status ON/OFF.
5	LICL005ATIROOTEM01	Room Temperature	°C		1		1	
6	LICL005ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature: **No Heating Device**
7	LICL005RADMINVEC01	Radiator: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON: **Not Active**
8	LICL005RADMINVAM01	Radiator: Minutes ON	minutes		1		1	Cumulative in the hour: **Not Active**.
9	LICL005RADHOUVAM01	Radiator: Hours ON	hours		1		1	Cumulative from the installation: **Not Active**.
10	LICL005RADPIDORC01	Radiator: Control signal	%		1		1	**Control signal: < 50% R1 = OFF; > 50% R1 = ON - Not Active.**
11	LICL005WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
12	LICL005OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
13	LICL005RADTHRADS01	Threshold Radiator 1	%		1		1	Set-Point to switch ON/OFF Valve. **used by IES only to calibrate the building model**
14	LICL005ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				3	**10**	**0**	**13**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	LICL005ALILILEDH01	Lighting: Control signal	volt	1	1	1	3	Average among all value of **LICL005ALIOLPIDD01** in the specific time interval
2	LICL005ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	**[Number of Events that LICL005ALIOLPIDD01>0] * 5 [minutes]**, in the specific interval
3	LICL005ALIBLRROH01	Room Brightness	Lux	1	1	1	3	Average among all values of **LICL005ALIBLRROM01** in the specific time interval
4	LICL005ALISPBLRH01	Set Point Room Brightness	lux	1	1	1	3	Last value of **LICL005ALISPBLRS01** in the specific time interval
5	LICL005ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all values of **LICL005ATIROOTEM01** in the specific time interval
6	LICL005ATISPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **LICL005ATIROOTES01** in the specific time interval. **Not Active**.
7	LICL005OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	[Number of events that **LICL005OCCPRESEM01 > 0**] *** 5 [minutes]**, in the specific time interval
8	LICL005RADMINVAM01	Radiator (Valve): Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **LICL005RADMINVAM01** in the specific time interval. Not Active.
9	LICL005WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **LICL005WINWIOPEM01 > 0**] * 5 [minutes], in the specific time interval
10	LICL005ALIERGCOH01	Room Lighting Energy Consumption	kWh	1	1	1		**[LICL005ALIMINLIH01 * (LICL005ALILIFLUH01/10) * TotalWatt = (4 x 16W + 2 x 60W) = 184 [Watt].**
11	LICL005ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		[**LICL005ATIROOTEM01 > LICL005ATIROOTEM01**] AND [**LICL005RADMINVAH01>0**]
12	LICL005ATILHTSPH01	"Luxamb > Set-point & Light ON"	events	1	1	1		[**LICL005ALIBLRROM01** > **LICL005ALISPBLRS01**] AND [**LICL005ALIOLPIDD01>0**] in the specific time interval
13	LICL005WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**LICL005WINWIOPEH01>0** AND **LICL005RADMINVAH01>0**] in the specific time interval
13	LICL005OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**LICL005OCCROWOWM01 <> 0**] in the specific time interval
14	LICL005ALILOANOH01	Counter: "Light ON & no occupancy"	events	1	1	1		[**LICL005ALIMINLIH01>0**] AND [**LICL005OCCPRESEM01=0**] in the specific time interval
			TOTALS	**15**	**15**	**14**	**26**	
				70				

Figure 4-6: Room #5 - physical measurement and HQDS variables.

	Label	Room #08	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.22 - Data received by DOKI - Data Transmission = 5 minutes.
1	LICL006ALILIFLUC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	LICL006ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour.
3	LICL006ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative for the installation.
4	LICL006OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	LICL006ATIROOTEM01	Room Temperature	°C		1		1	
6	LICL006ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature: **No Heating Device**
7	LICL006RADMINVEC01	Radiator: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON: **Not Active**
8	LICL006RADMINVAM01	Radiator: Minutes ON	minutes		1		1	Cumulative in the hour: **Not Active**.
9	LICL006RADHOUVAM01	Radiator: Hours ON	hours		1		1	Cumulative from the installation: **Not Active**.
10	LICL006RADPIDORC01	Radiator: Control signal	%		1		1	**Control signal: < 50% R1 = OFF; > 50% R1 = ON - Not Active.**
11	LICL006WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
12	LICL006OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
13	LICL006RADTHRADS01	Threshold Radiator 1	%		1		1	Set-Point to switch ON/OFF Valve. **used by IES only to calibrate the building model**
14	LICL006ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				4	**10**	**0**	**14**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	LICL006ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **LICL006ALIMINLIM01** in the specific time interval
2	LICL006ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average value of **LICL006ATIROOTEM01** in the specific time interval
3	LICL006ATISPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **LICL006ATIROOTES01** in the specific time interval. **Not Active**.
4	LICL006OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	[Number of events that **LICL006OCCPRESEM01>0**] *** 5 [minutes]** in the specific time interval
5	LICL006RADMINVAM01	Radiator (Valve): Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **LICL006RADMINVAM01** in the specific time interval. **Not Active**.
6	LICL006WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **LICL006WINWIOPEM01>0**] * 5 [minutes] in the specific time interval
7	LICL006ALIERGCOH01	Room Lighting Energy Consumption	kWh	1	1	1		**[LICL006ALIMINLIH01 * TotalWatt]/1000; TotalWatt = (6 x 4 x 18W) = 432 [Watt]**
8	LICL006ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		[**LICL006ATIROOTEH01 > LICL006ATSPTEMH01**] AND [**LICL006RADMINVAM01**>0]. **Not Active**.
9	LICL006WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**LICL006WINWIOPEM01>0** AND **LICL006RADMINVAH01>0**]. **Not Active**.
10	LICL006OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**LICL006OCCROWOWM01** <> 0] in the specific time interval
11	LICL006ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[(**LICL006ALIMINLIH01** > 0) AND (**LICL006OCCPRESEH01** = 0)] in the specific time interval
			TOTALS	**11**	**11**	**10**	**17**	
				49				

Figure 4-7: Room #8 - physical measurement and HQDS variables.

	Label	Room #09	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.23 - Data received by DOKI - Data Transmission = 5 minutes.
1	LICL007ALILIFLUC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	LICL007ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour.
3	LICL007ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative for the installation.
4	LICL007OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	LICL007ATIROOTEM01	Room Temperature	°C		1		1	
6	LICL007ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature: **No Heating Device**
7	LICL007RADMINVEC01	Radiator: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON: **Not Active**
8	LICL007RADMINVAM01	Radiator: Minutes ON	minutes		1		1	Cumulative in the hour: **Not Active**.
9	LICL007RADHOUVAM01	Radiator: Hours ON	hours		1		1	Cumulative from the installation: **Not Active**.
10	LICL007RADPIDORC01	Radiator: Control signal	%		1		1	**Control signal: < 50% R1 = OFF; > 50% R1 = ON - Not Active.**
11	LICL007WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
12	LICL007OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
13	LICL007RADTHRADS01	Threshold Radiator 1	%		1		1	Set-Point to switch ON/OFF Valve. **used by IES only to calibrate the building model**
14	LICL007ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				4	**10**	**0**	**14**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	LICL007ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **LICL007ALIMINLIM01** in the specific time interval
2	LICL007ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average value of **LICL007ATIROOTEM01** in the specific time interval
3	LICL007ATISPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **LICL007ATIROOTES01** in the specific time interval. **Not Active**.
4	LICL007OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	[Number of events that **LICL007OCCPRESEM01>0**] *** 5 [minutes]** in the specific time interval
5	LICL007RADMINVAM01	Radiator (Valve): Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **LICL007RADMINVAM01** in the specific time interval. **Not Active**.
6	LICL007WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **LICL007WINWIOPEM01>0**] * 5 [minutes] in the specific time interval
7	LICL007ALIERGCOH01	Room Lighting Energy Consumption	kWh	1	1	1		**[LICL007ALIMINLIH01 * TotalWatt]/1000; TotalWatt = (6 x 4 x 18W) = 432 [Watt];**
8	LICL007ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		[**LICL007ATIROOTEH01 > LICL007ATSPTEMH01**] AND [**LICL007RADMINVAM01**>0]. **Not Active**.
9	LICL007WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**LICL007WINWIOPEM01>0** AND **LICL007RADMINVAH01>0**]. **Not Active**.
10	LICL007OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**LICL007OCCROWOWM01** <> 0] in the specific time interval
11	LICL007ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[(**LICL007ALIMINLIH01** > 0) AND (**LICL007OCCPRESEH01** = 0)] in the specific time interval
			TOTALS	**11**	**11**	**10**	**17**	
				49				

Figure 4-8: Room #9 - physical measurement and HQDS variables.

	Label	Room #10 (Library)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.24 - Data received by DOKI - Data Transmission = 5 minutes.
1	LILY001ALILIFLUC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	LILY001ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour.
3	LILY001ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative for the installation.
4	LILY001OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	LILY001ATIROOTEM01	Room Temperature	°C		1		1	
6	LILY001ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature: **No Heating Device**
7	LILY001RADMINVEC01	Radiator: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON: **Not Active**
8	LILY001RADMINVAM01	Radiator: Minutes ON	minutes		1		1	Cumulative in the hour: **Not Active**.
9	LILY001RADHOUVAM01	Radiator: Hours ON	hours		1		1	Cumulative from the installation: **Not Active**.
10	LILY001RADPIDORC01	Radiator: Control signal	%		1		1	**Control signal: < 50% R1 = OFF; > 50% R1 = ON - Not Active.**
11	LILY001WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
12	LILY001OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
13	LILY001RADTHRADS01	Threshold Radiator 1	%		1		1	Set-Point to switch ON/OFF Valve. **used by IES only to calibrate the building model**
14	LILY001ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				4	**10**	**0**	**14**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	LILY001ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **LILY001ALIMINLIM01** in the specific time interval
2	LILY001ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average value of **LILY001ATIROOTEM01** in the specific time interval
3	LILY001ATISPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **LILY001ATIROOTES01** in the specific time interval. **Not Active**.
4	LILY001OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	[Number of events that **LILY001OCCPRESEM01>0**] *** 5 [minutes]** in the specific time interval
5	LILY001RADMINVAM01	Radiator (Valve): Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **LILY001RADMINVAM01** in the specific time interval. **Not Active**.
6	LILY001WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **LILY001WINWIOPEM01>0**] * 5 [minutes] in the specific time interval
7	LILY001ALIERGCOH01	Room Lighting Energy Consumption	kWh	1	1	1		**[LILY001ALIMINLIH01 * TotalWatt]/1000; TotalWatt = (8 x 4 x 18W) = 576 [Watt]**
8	LILY001ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		[**LILY001ATIROOTEH01 > LILY001ATSPTEMH01**] AND [**LILY001RADMINVAM01**>0]. **Not Active**.
9	LILY001WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**LILY001WINWIOPEM01>0** AND **LILY001RADMINVAH01>0**]. **Not Active**.
10	LILY001OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**LILY001OCCROWOWM01** <> 0] in the specific time interval
11	LILY001ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[(**LILY001ALIMINLIH01** > 0) AND (**LILY001OCCPRESEH01** = 0)] in the specific time interval
			TOTALS	**11**	**11**	**10**	**17**	
				49				

Figure 4-9: Room #10 (Library) - physical measurement and HQDS variables.

	Label	Employees	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.13 - Data received by DOKI - Data Transmission = 5 minutes.
1	LIHA001ALILIFLUC01	Lighting: Status	ON/OFF	1			**1**	0 = OFF; 1 = ON. type fluorescent
2	LIHA001ALIMINLIM01	Lighting: Minutes ON	minutes		1		**1**	Cumulative in the hour.
3	LIHA001ALIHOULIM01	Lighting: Hours ON	hours		1		**1**	Cumulative for the installation.
4	LIHA001OCCPRESEM01	Presence Sensor	yes / no	1			**1**	0 = NO; 1 = YES
5	LIHA001ATIROOTEM01	Room Temperature	°C		1		**1**	
6	LIHA001ATIROOTES01	Set-Point Room Temperature	°C		1		**1**	Current Set-Point of the Room Temperature: **No Heating Device**
7	LIHA001WINWIOPEM01	Windows: status	close/open	1			**1**	0 = Windows CLOSED; 1 = Windows OPENED
8	LIHA001OCCROWOWM01	Room Control Status	-		1		**1**	**0 = automatic; 1 = manual; 2 = stand-by.**
9	LIHA001ALIWAITIT01	Waiting Time	minutes		1		**1**	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				3	**6**	**0**	**9**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	**LIHA001ALIMINLIH01**	Lighting: Minutes ON	minutes	1	1	1	**3**	ABS (last value - first value) of **LIHA001ALIMINLIM01** in the specific time interval
2	**LIHA001ATIROOTEH01**	Room Temperature	°C	1	1	1	**3**	Average value of **LIHA001ATIROOTEM01** in the specific time interval
3	**LIHA001ATSPTEMH01**	Set-Point Room Temperature	°C	1	1		**2**	Last value of **LIHA001ATIROOTES01** in the specific time interval. **Not Active**.
4	**LIHA001OCCPRESEH01**	Presence Sensor	minutes	1	1	1	**3**	[Number of events that **LIHA001OCCPRESEM01>0**] *** 5 [minutes]** in the specific time interval
5	**LIHA001WINWIOPEH01**	Windows: Minutes Opened	minutes	1	1	1	**3**	[Number of events that **LIHA001WINWIOPEM01>0**] * 5 [minutes] in the specific time interval
6	**LIHA001ALIERGCOH01**	Room Lighting Energy Consumption	kWh	1	1	1		**[LIHA001ALIMINLIH01 * TotalWatt]/1000; TotalWatt = (2 x 58W) = 116 [Watt]**;
7	**LIHA001OCCROWOWH01**	"BMS not in automatic control"	events	1	1	1		[**LIHA001OCCROWOWM01 <> 0**] in the specific time interval
8	**LIHA001ALILOANOH01**	"Light ON & no occupancy"	events	1	1	1		[**LIHA001ALIMINLIH01>0** AND **LIHA001OCCPRESEH01=0**] in the specific time interval
			TOTALS	**8**	**8**	**7**	**14**	
				37				

Figure 4-10: Employees - physical measurement and HQDS variables.

	Label	Corridor #01 (Ground Floor)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.12 - Data received by DOKI - Data Transmission = 5 minutes.
1	LICO001ALILIFLUC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	LICO001ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour.
3	LICO001ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative for the installation.
4	LICO001OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	LICO001ATIROOTEM01	Room Temperature	°C		1		1	
6	LICO001ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature: **No Heating Device**
7	LICO001WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
8	LICO001OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
9	LICO001ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				3	**6**	**0**	**9**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	**LICO001ALIMINLIH01**	Lighting: Minutes ON	minutes	1	1	1	**3**	ABS (last value - first value) of **LICO001ALIMINLIM01** in the specific time interval
2	**LICO001ATIROOTEH01**	Room Temperature	°C	1	1	1	**3**	Average value of **LICO001ATIROOTEM01** in the specific time interval
3	**LICO001ATSPTEMH01**	Set-Point Room Temperature	°C	1	1		**2**	Last value of **LICO001ATIROOTES01** in the specific time interval. **Not Active**.
4	**LICO001OCCPRESEH01**	Presence Sensor	minutes	1	1	1	**3**	[Number of events that **LICO001OCCPRESEM01>0**] *** 5 [minutes]** in the specific time interval
5	**LICO001WINWIOPEH01**	Windows: Minutes Opened	minutes	1	1	1	**3**	[Number of events that **LICO001WINWIOPEM01>0**] * 5 [minutes] in the specific time interval
6	**LICO001ALIERGCOH01**	Room Lighting Energy Consumption	kWh	1	1	1		**[LICO001ALIMINLIH01 * TotalWatt]/1000; TotalWatt = (2 x 36W + 4 x 18W) = 144 [Watt]**
7	**LICO001OCCROWOWH01**	"BMS not in automatic control"	events	1	1	1		[**LICO001OCCROWOWM01 <> 0**] in the specific time interval
8	**LICO001ALILOANOH01**	"Light ON & no occupancy"	events	1	1	1		[**LICO001ALIMINLIH01>0** AND **LICO001OCCPRESEH01=0**] in the specific time interval
			TOTALS	**8**	**8**	**7**	**14**	
				37				

Figure 4-11: Corridor #1 (F0) - physical measurement and HQDS variables.

	Label	Corridor #02 (First Floor)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.25 - Data received by DOKI - Data Transmission = 5 minutes.
1	LICO002ALILIFLUC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	LICO002ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour.
3	LICO002ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative for the installation.
4	LICO002OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	LICO002ATIROOTEM01	Room Temperature	°C		1		1	
6	LICO002ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature: **No Heating Device**
7	LICO002WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
8	LICO002OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
9	LICO002ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				3	**6**	**0**	**9**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	**LICO002ALIMINLIH01**	Lighting: Minutes ON	minutes	1	1	1	**3**	ABS (last value - first value) of **LICO002ALIMINLIM01** in the specific time interval
2	**LICO002ATIROOTEH01**	Room Temperature	°C	1	1	1	**3**	Average value of **LICO002ATIROOTEM01** in the specific time interval
3	**LICO002ATSPTEMH01**	Set-Point Room Temperature	°C	1	1		**2**	Last value of **LICO002ATIROOTES01** in the specific time interval. **Not Active**.
4	**LICO002OCCPRESEH01**	Presence Sensor	minutes	1	1	1	**3**	[Number of events that **LICO002OCCPRESEM01>0**] *** 5 [minutes]** in the specific time interval
5	**LICO002WINWIOPEH01**	Windows: Minutes Opened	minutes	1	1	1	**3**	[Number of events that **LICO002WINWIOPEM01>0**] * 5 [minutes] in the specific time interval
6	**LICO002ALIERGCOH01**	Room Lighting Energy Consumption	kWh	1	1	1		**[LICO002ALIMINLIH01 * TotalWatt]/1000; TotalWatt = (6 x 4 x 18W) = 432 [Watt]**
7	**LICO002OCCROWOWH01**	"BMS not in automatic control"	events	1	1	1		[**LICO002OCCROWOWM01 <> 0**] in the specific time interval
8	**LICO002ALILOANOH01**	"Light ON & no occupancy"	events	1	1	1		[**LICO002ALIMINLIH01>0** AND **LICO002OCCPRESEH01=0**] in the specific time interval
			TOTALS	**8**	**8**	**7**	**14**	
				37				

Figure 4-12: Corridor #2 (F1) - physical measurement and HQDS variables.

	Label	Bathroom (First Floor)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.20 - Data received by DOKI - Data Transmission = 5 minutes.
1	LIWC001ALILIFLUC01	Lighting: Status	ON/OFF	1			**1**	0 = OFF; 1 = ON. type fluorescent
2	LIWC001ALIMINLIM01	Lighting: Minutes ON	minutes		1		**1**	Cumulative in the hour.
3	LIWC001ALIHOULIM01	Lighting: Hours ON	hours		1		**1**	Cumulative for the installation.
4	LIWC001OCCPRESEM01	Presence Sensor	yes / no	1			**1**	0 = NO; 1 = YES
5	LIWC001ATIROOTEM01	Room Temperature	°C		1		**1**	
6	LIWC001ATIROOTES01	Set-Point Room Temperature	°C		1		**1**	Current Set-Point of the Room Temperature: **No Heating Device**
7	LIWC001WINWIOPEM01	Windows: status	close/open	1			**1**	0 = Windows CLOSED; 1 = Windows OPENED
8	LIWC001OCCROWOWM01	Room Control Status	-		1		**1**	**0 = automatic; 1 = manual; 2 = stand-by.**
9	LIWC001ALIWAITIT01	Waiting Time	minutes		1		**1**	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				3	**6**	**0**	**9**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	**LIWC001ALIMINLIH01**	Lighting: Minutes ON	minutes	1	1	1	**3**	ABS (last value - first value) of **LIWC001ALIMINLIM01** in the specific time interval
2	**LIWC001ATIROOTEH01**	Room Temperature	°C	1	1	1	**3**	Average value of **LIWC001ATIROOTEM01** in the specific time interval
3	**LIWC001ATSPTEMH01**	Set-Point Room Temperature	°C	1	1		**2**	Last value of **LIWC001ATIROOTES01** in the specific time interval. **Not Active**.
4	**LIWC001OCCPRESEH01**	Presence Sensor	minutes	1	1	1	**3**	[Number of events that [**LIWC001OCCPRESEM01>0**] *** 5 [minutes]** in the specific time interval
5	**LIWC001WINWIOPEH01**	Windows: Minutes Opened	minutes	1	1	1	**3**	[Number of events that [**LIWC001WINWIOPEM01>0**] *** 5 [minutes]** in the specific time interval
6	**LIWC001ALIERGCOH01**	Room Lighting Energy Consumption	kWh	1	1	1		**[LIWC001ALIMINLIH01 * TotalWatt]/1000; TotalWatt = (1 x 58W) = 58 [Watt]**
7	**LIWC001OCCROWOWH01**	"BMS not in automatic control"	events	1	1	1		[**LIWC001OCCROWOWM01 <> 0**] in the specific time interval
8	**LIWC001ALILOANOH01**	"Light ON & no occupancy"	events	1	1	1		[**LIWC001ALIMINLIH01>0** AND **LIWC001OCCPRESEH01=0**] in the specific time interval
			TOTALS	**8**	**8**	**7**	**14**	
				37				

Figure 4-13: Bathroom (F1) - physical measurement and HQDS variables.

	Label	Meteo data	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.13 - Data received by DOKI - Data Transmission = 5 minutes.
1	LIPP003ATEEXTTEM01	External Temperature	°C		1		1	**sensor has been located outside near the Employyes room window and it is connected to the Control Box labeled "Hall F0"**
				0	**1**	**0**	**1**	
N	**HQDS; High Quality Data Set**			**15'**	**h**	**Day**	**QI**	
1	LIPP003ATEEXTTEH01	External Temperature	°C	**1**	**1**	**1**	**3**	Average among all value in the specific time interval.
	Label	**Pilot Electrical Measurement**	**Unit**	**Dig**	**Ang**	**SW**	**TOTAL**	**EVO IP address: 10.0.1.26 - Data received by DOKI - Data Transmission = 5 minutes.**
1	LIPP001ELCENRGYM01	Energy Consumption (Active)	kWh		1		**1**	Cumulative from the installation
2	LIPP001ELCPOWERM01	Electrical Power (Active)	Watt		1		**1**	
3	LIPP001ELCRERGYM01	Reactive Energy Consumption	KVarh		1		**1**	Cumulative from the installation.
4	LIPP001ELCROWERM01	Reactive Power	Kvar		1		**1**	
5	LIPP001ELCAMPERM01	Electrical Current: Phase 1	Ampere		1		**1**	It is used only by IES for calibration of the building model
6	LIPP001ELCAMPERM02	Electrical Current: Phase 2	Ampere		1		**1**	It is used only by IES for calibration of the building model
7	LIPP001ELCAMPERM03	Electrical Current: Phase 3	Ampere		1		**1**	It is used only by IES for calibration of the building model
8	LIPP001ELCVOLTAM01	Voltage: Phase1	Volt		1		**1**	It is used only by IES for calibration of the building model
9	LIPP001ELCVOLTAM02	Voltage: Phase2	Volt		1		**1**	It is used only by IES for calibration of the building model
10	LIPP001ELCVOLTAM03	Voltage: Phase3	Volt		1		**1**	It is used only by IES for calibration of the building model
1	LIPP002ELCENRGYM01	Energy Consumption (Active)	kWh		1		**1**	Cumulative from the installation
2	LIPP002ELCPOWERM01	Electrical Power (Active)	Watt		1		**1**	
3	LIPP002ELCRERGYM01	Reactive Energy Consumption	KVarh		1		**1**	Cumulative from the installation.
4	LIPP002ELCROWERM01	Reactive Power	KVarh		1		**1**	
5	LIPP002ELCAMPERM01	Electrical Current: Phase 1	Ampere		1		**1**	It is used only by IES for calibration of the building model
6	LIPP002ELCAMPERM02	Electrical Current: Phase 2	Ampere		1		**1**	It is used only by IES for calibration of the building model
7	LIPP002ELCAMPERM03	Electrical Current: Phase 3	Ampere		1		**1**	It is used only by IES for calibration of the building model
8	LIPP002ELCVOLTAM01	Voltage: Phase1	Volt		1		**1**	It is used only by IES for calibration of the building model
9	LIPP002ELCVOLTAM02	Voltage: Phase2	Volt		1		**1**	It is used only by IES for calibration of the building model
10	LIPP002ELCVOLTAM03	Voltage: Phase3	Volt		1		**1**	It is used only by IES for calibration of the building model
				0	**20**	**0**	**20**	
N	**HQDS; High Quality Data Set**			**15'**	**h**	**Day**	**QI**	
1	**LIPP001ELCENRGYH01**	Electricity Consumption	kWh	1	1	1	**3**	(last value - first value) of LIPP001ELCENRGYM01 in the specific time interval. Active Energy
2	**LIPP001ELCPOWERH01**	Electrical Power	Watt	1	1	1	**3**	Average among all value of LIPP001ELCPOWERM01 in the specific time interval. Active Power
3	**LIPP001ELCROWERH02**	Reactive Eenergy	KVarh	1	1	1	**3**	(last value - first value) of LIPP001ELCRERGYM01 in the specific time interval
4	**LIPP001ELCROWERH01**	Reactive Power	Kvar	1	1	1	**3**	average among all values of LIPP001ELCROWERM01 in the specific time interval
1	**LIPP002ELCENRGYH01**	Electricity Consumption	kWh	1	1	1	**3**	[(last - first) value of **LIPP002ELCENRGYM01**] in the specific time interval
2	**LIPP002ELCPOWERH01**	Electrical Power	Watt	1	1	1	**3**	**[LIPP002ELCPOWERM01]**
3	**LIPP002ELCRERGYH01**	Reactive Eenergy	KVarh	1	1	1	**3**	[(last - first) value of [**LIPP002ELCRERGYM01**] in the specific time interval
4	**LIPP002ELCROWERH01**	Reactive Power	KVarh	1	1	1	**3**	**[LIPP002ELCROWERM01]**
			TOTALS	**8**	**8**	**8**	**24**	
				48				

Figure 4-14: Meteo and Pilot Electrical Measurement, with HQDS variables.

School								
N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	Hour	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	**LIPS001ELCENRGYH01**	Electricity Consumption	kWh	1	1	1	**3**	[**LIPP001ELCENRGYH01** + **LIPP002ELCENRGYM01**] in the specific time interval
2	**LIPS001ELCPOWERH01**	Electrical Power	Watt	1	1	1	**3**	**[LIPP001ELCPOWERH01 + LIPP002ELCPOWERH01] in the specific time interval**
3	**LIPS001ELCRERGYH01**	Reactive Eenergy	KVarh	1	1	1	**3**	[**LIPP001ELCRERGYH01** + **LIPP002ELCRERGYH01**] in the specific time interval
4	**LIPS001ELCROWERH01**	Reactive Power	KVarh	1	1	1	**3**	**[LIPP001ELCROWERH01 + LIPP002ELCROWERH01] in the specific time interval**
5	**LIPS001ELCPOMAXH01**	MAX Electrical Power	Watt			1		MAX of **LIPS001ELCPOWERH01** in the specific time interval
6	**LIPS001ELCROMAXH01**	MAX Reactive Electrical Power	Kvar			1		MAX of **LIPS001ELCROWERH01** in the specific time interval
7	**LIPS001ELCENRPKH01**	Electricity Consumption PEAK hours	kWh			1		To be calculated daily
8	**LIPS001ELCENOPKH01**	Electricity Consumption OFF-PEAK hours	kWh			1		To be calculated daily
9	**LIPS001ELCLITOTH01**	Lighting Energy Consumption	kWh			1		[Sum(**LIxxxxxALIERGCLH01**)] in the specific interval. **All classrooms and environments.**
10	**LIPS001ELCLILEDH01**	LED Lighting Consumption	kWh			1		To be calculated daily: **[LICL004ALIERGCLH01+LICL005ALIERGCLH01)]**
11	**LIPS001ELCLILFLUH01**	Traditional Lighting Consumption	kWh			1		[**LIPS001ELCLITOTH01**] - [**LIPS001ELCLILEDH01**]
12	**LIPS001ELCLILDIMD01**	Lighting Consumption with Dimming	kWh			1		Equal to [**LIPS001ELCLILEDH01**]
13	**LIPS001ELCLIKPIH01**	Lighting Energy Indicator	kWh/m²			1		[**LIPS001ELCLITOTH01**]/[surface] - To be calculated for each day
14	**LIPS001ELCTOKPIH01**	Electrical Energy Indicator	kWh/m²			1		[**LIPS001ELCENRGYH01**]/[**surface**] - To be calculated for each day
			TOTALS	**4**	**4**	**14**	**12**	
				34				

Figure 4-15: School: HQDS variables and Energy Indicators.