EUROPEAN COMMISSION
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DELIVERABLE

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D6.1 Pilots Implementation:
Annex A – LESA Pilot

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PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

REVISION HISTORY AND STATEMENT OF ORIGINALITY

D6.1 Pilots Implementation: Annex A – LESA Pilot

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

Document Control

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Deliverable 6.1 - Leader: **EAP** (*Liyana Adjarova*)

File Reference: **D6.1 Annex A – LESA Pilot**

Statement of originality:

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

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V1.0	20/11/2013	First document delivered for comments and additional content.	POn

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1. Lesa Pilot

1.1 The site

The the town of LESA is located in the Lago Maggiore region (province of Novara) in the North-West of Italy. The Elementary and Middle-grade school is a single building built in 1974 with total area of 3,056 m^2 and heating volume of about 11,160 m^3. It is a two story building that during the school year hosts an average of 220 people (both staff and students).

The building is a typical construction of the 70s and did not have any specific energy savings provision. The Municipality, who is the owner of the school, underwent an important restructuring plan to realize energy savings by substituting the heat generators, installing solar panels and adding insulation material specifically under the roof top.

Pilot area is the first floor, and has net indoor area of 939 m^2. Pilot consist of classrooms, laboratories, offices, library, lobbies, corridors and WC-s. Pilot area hosts approximately 102 people.

Item	BUILDING DATA	PILOT DATA	Item	BUILDING DATA	PILOT DATA
Gross indoor area [m^2]:	3.287,46	938,74	Gross indoor volume [m^3]:	11.160,00	3.097,84
Net indoor area [m^2]	3.055,72	878,94	Net indoor volume[m^3]:	3.296,87	2.448,58
Number of Building floors:	2+1 (cellar) = 3	1	Envelope area A [m^2]:	5.885 (walls, roof, area on ground)	1.546,51
Gross Windows surface [m^2]:	417,68	127,34	Net heated area [m^2]:	3055,72	878,94
Gross floor height [m]:	~ 3+0,3+0,4 m	~ 3+0,3+0,4 m	Net heated space volume [m^3]:	10.716,27	2.636,82
Net floor height [m]:	~ 3m	~ 3m	Air- conditioned area [m^2]:	-	-
Total building height [m]:	PS 7,2	3+0,4+0,3/2=3,55	Air- conditioned space volume [m^3]:	-	-

Building data of Lesa School and Pilot area

Figure 1-1: Lesa School

1.2 Pilot Area Selection

The Pilot area is the overall 1st floor of the building, which hosts 9 Classrooms, 3 Bathrooms, Service Rooms, Entrance, Lobby and Corridors.

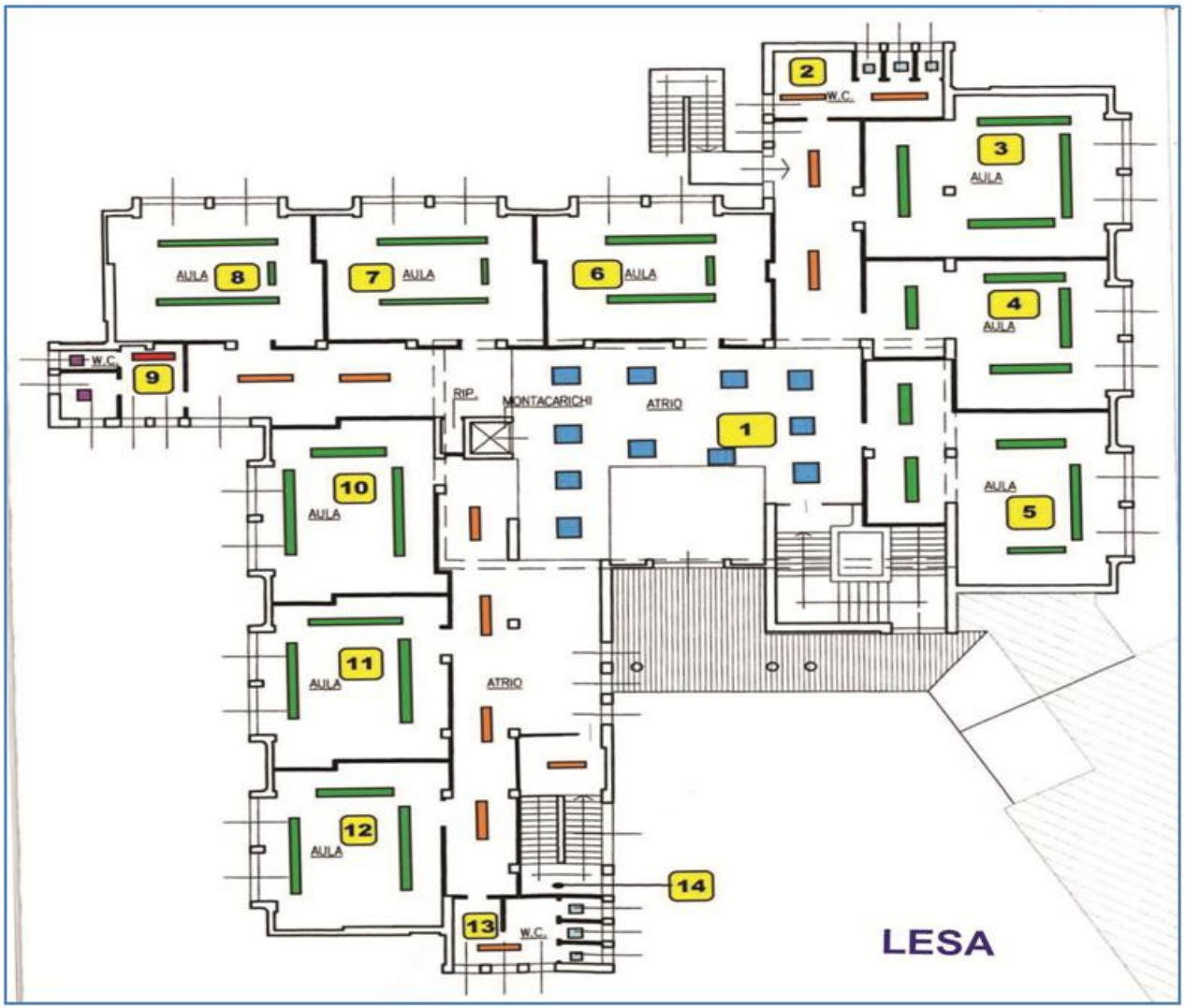


Figure 1-2: Lesa Pilot area

1.3 Documentation of the installation

The Lesa Pilot has been considered as a “laboratory”, where the basic ideas of the DOKI BEMS have been implemented and verified. For this reason the physical and interfacing solutions adopted for Lesa are sometimes different from those subsequently applied in the other 3 Pilots; but from the functional and use point of views affecting VSNavigator, the BEMS performances in Lesa are identical to those of the other 3 Pilots.
The installation of the EVO Modules, sensors and actuators have been performed wiring on site all components, including the ancillary components necessary to the operation of the EVO Modules themselves (like power supply, switches, overload circuits, connection terminals, etc.).
The whole set of documentation, detailing drawings, layouts, technical specification of equipment and cabling was produced with the objective of enabling the installer to perform the specific tasks while minimizing the possibility of making errors.

More in detail, document production included:

1. a list of modules and units to be installed in the Pilot, including the code number of each unit;
2. a general drawing which summarizes the links between the various modules that constitutes the Pilot with specific details of the type of cable to use for all connections (see figure in the next section);
3. a wiring diagram for each EVO Module (both for control of rooms/premise and for measure of energy) that shows the connections to be performed and the type of cable to be used for each input or output (see figures below);
4. final drawings reporting the wiring of every room following the conventions of the descriptions of the “boxed” units used in the other 3 pilots. These drawings are inserted in this report at the following point **2.1 Layouts: control network and Box Control Units**

2. The DOKI BEMS.

2.1 Layouts: control network and Box Control Units

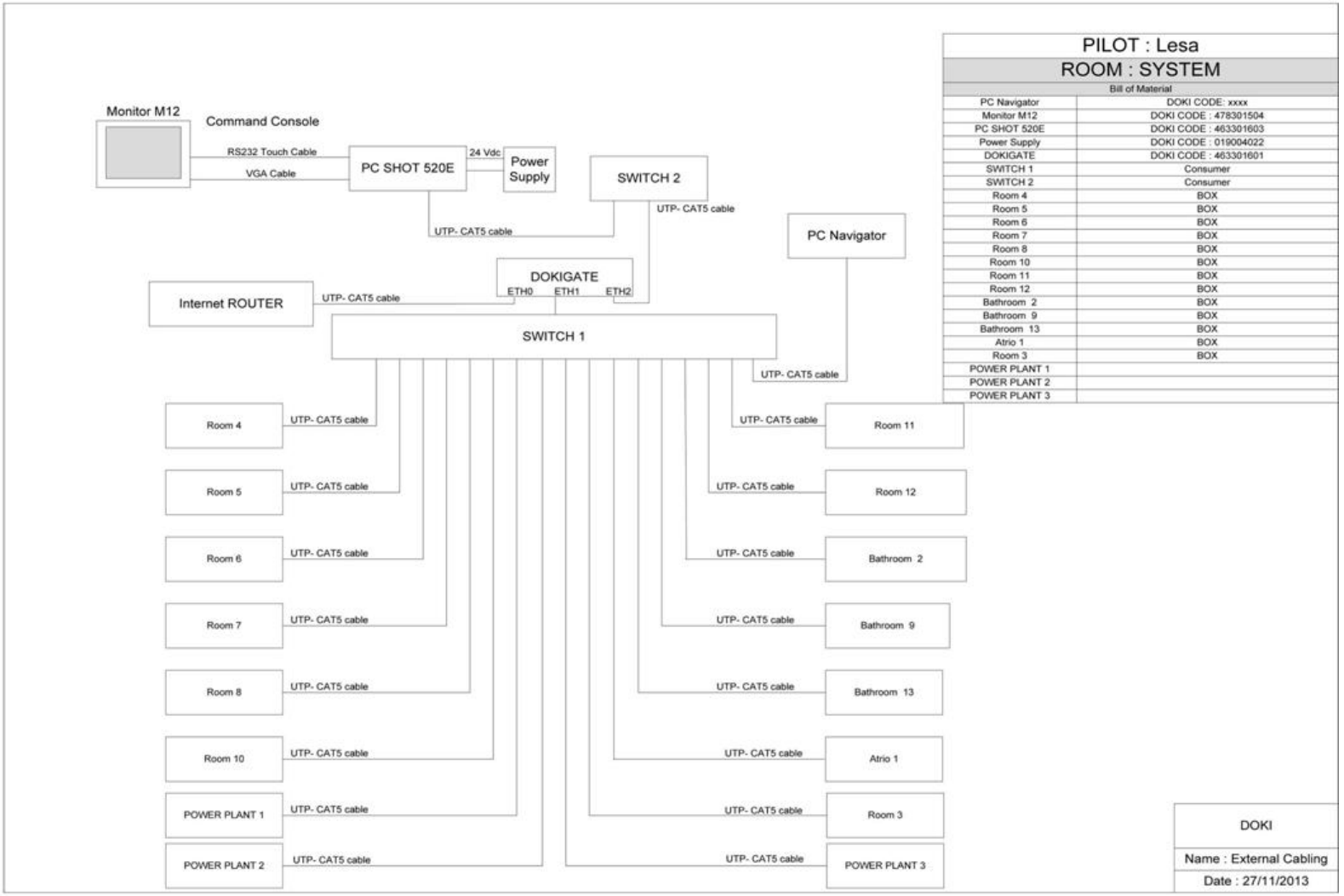


Figure 2-1: Wiring schema – Control Network

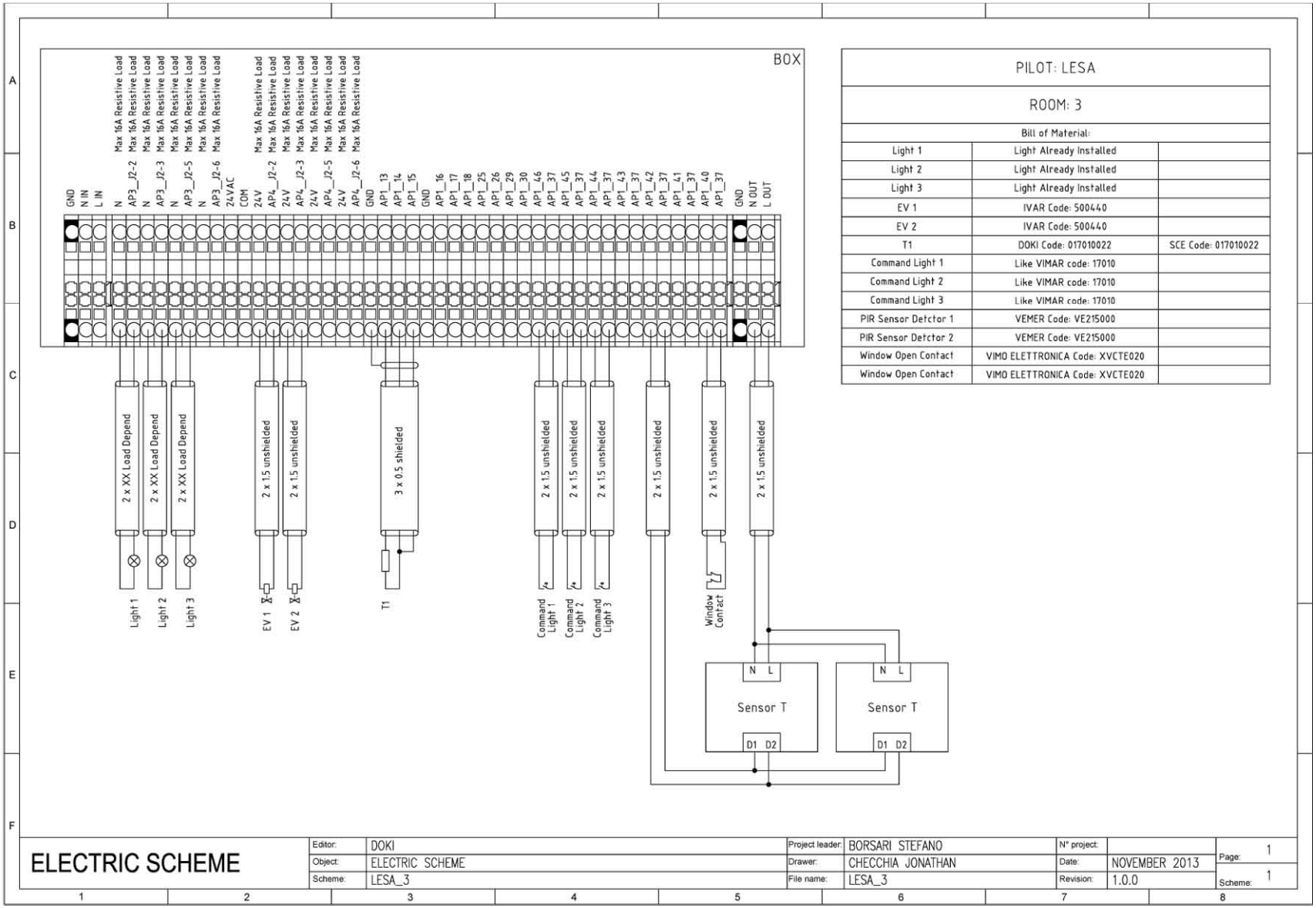


Figure 2-2: Wiring schema – Classroom #3

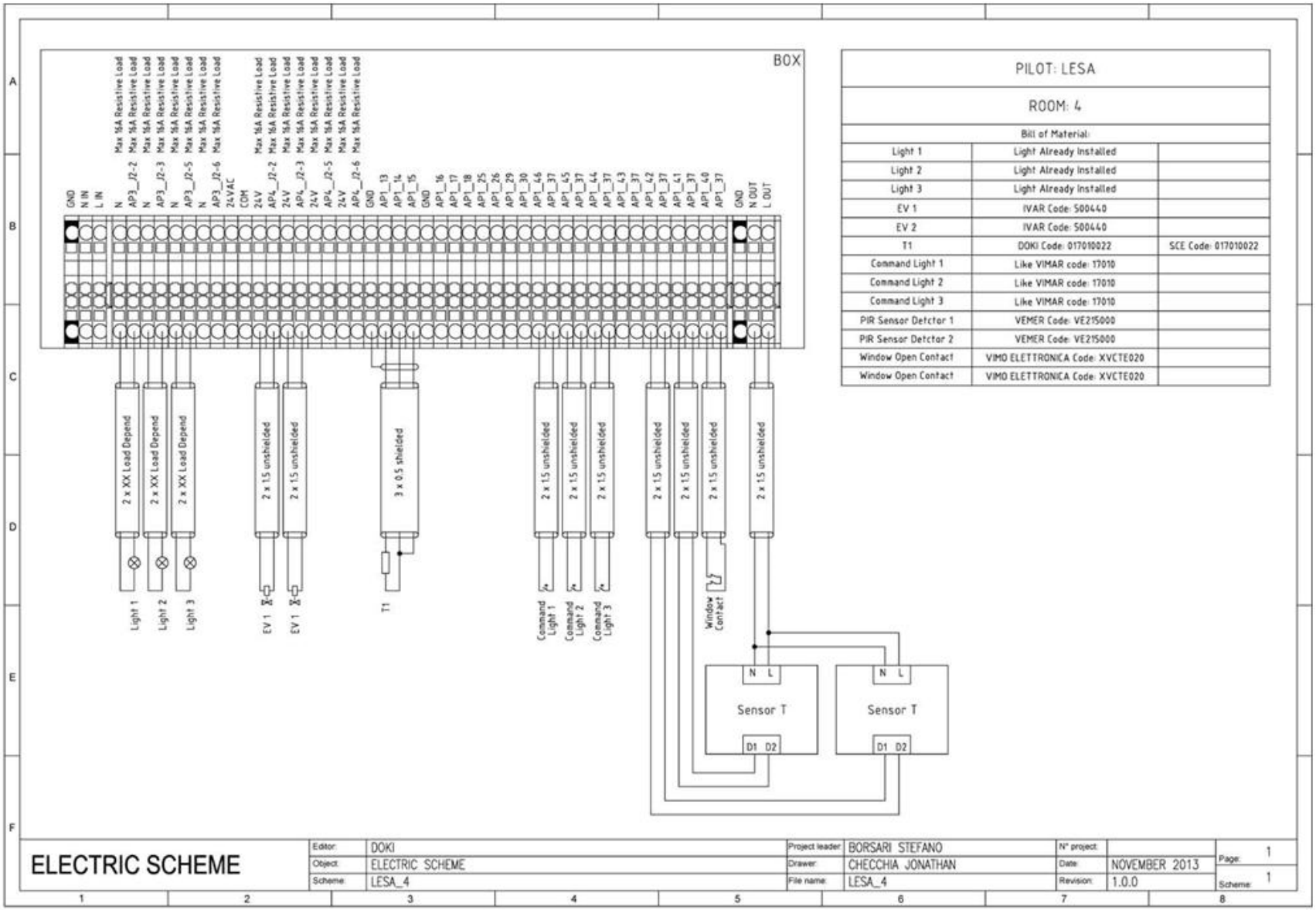


Figure 2-3: Wiring schema – Classroom #4

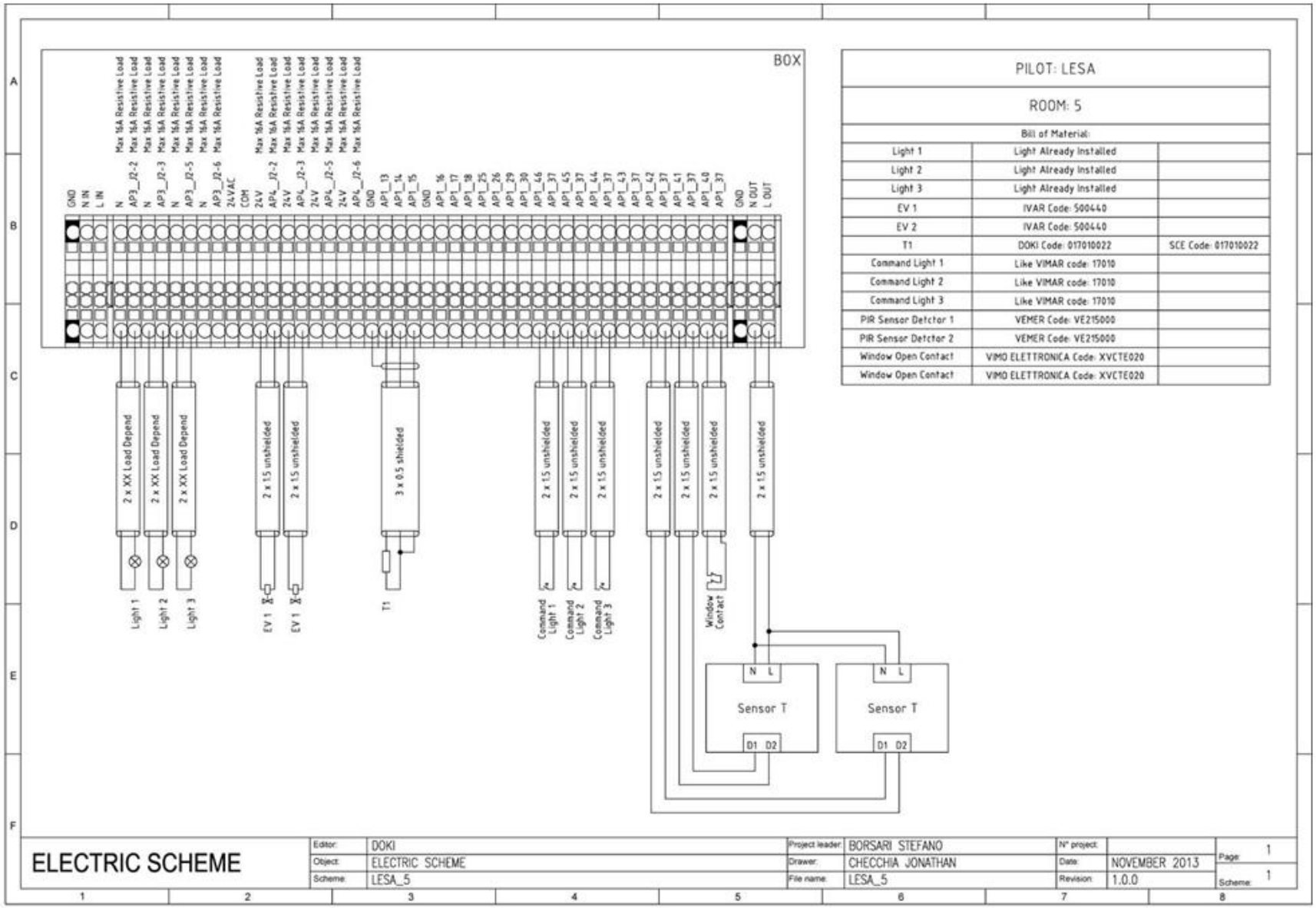


Figure 2-4: Wiring schema – Classroom #5

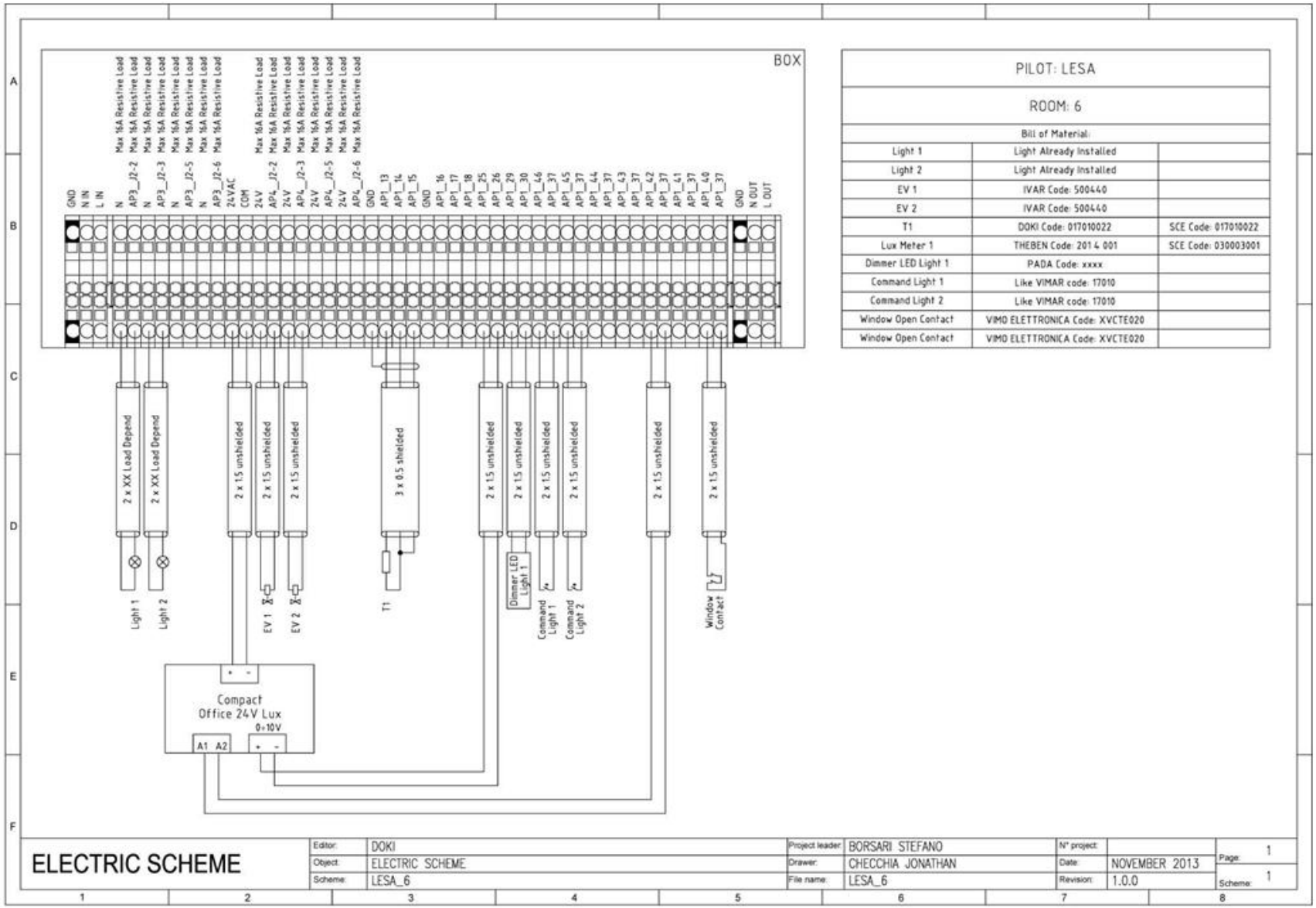


Figure 2-5: Wiring schema – Classroom #6

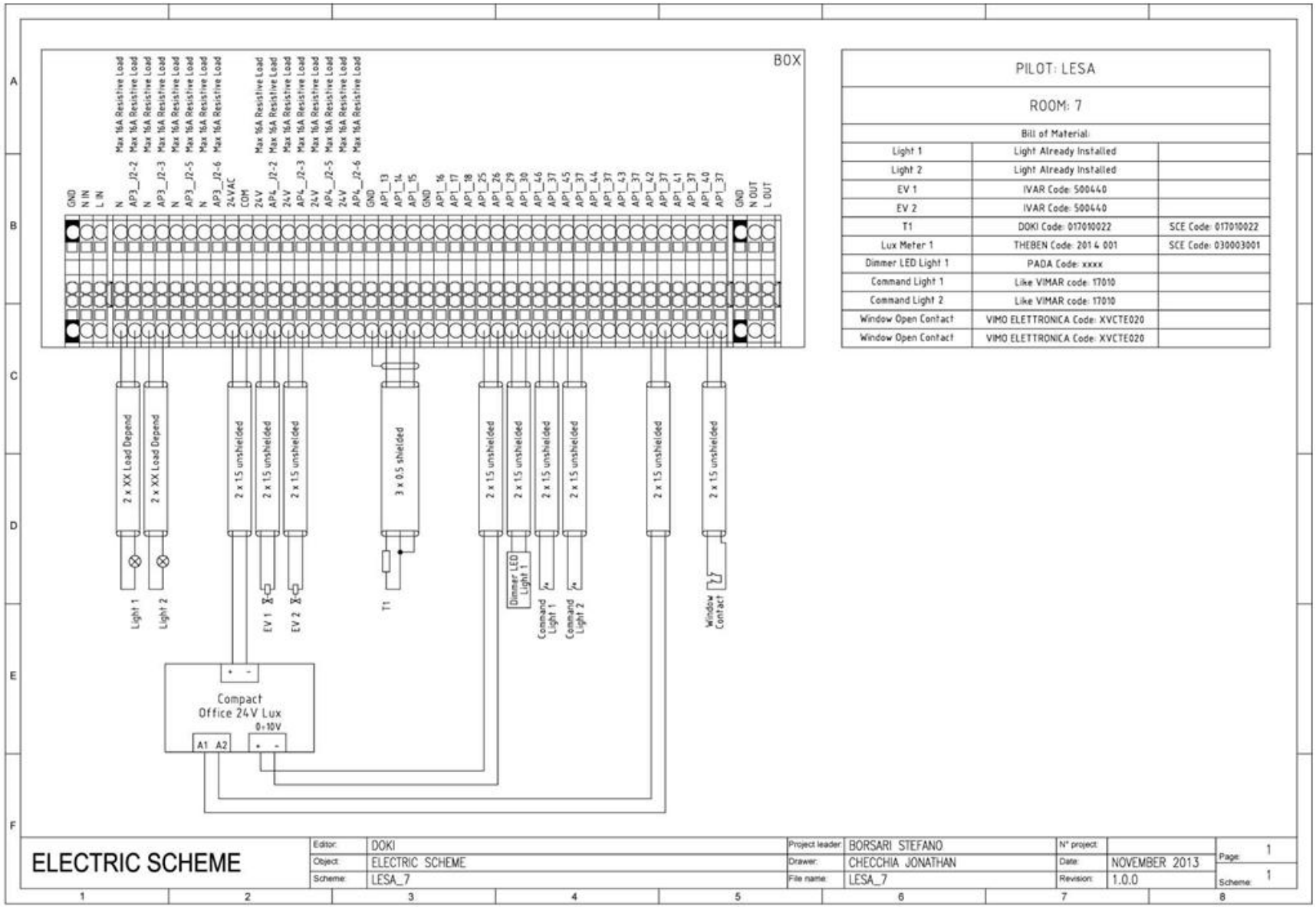


Figure 2-6: Wiring schema – Classroom #7

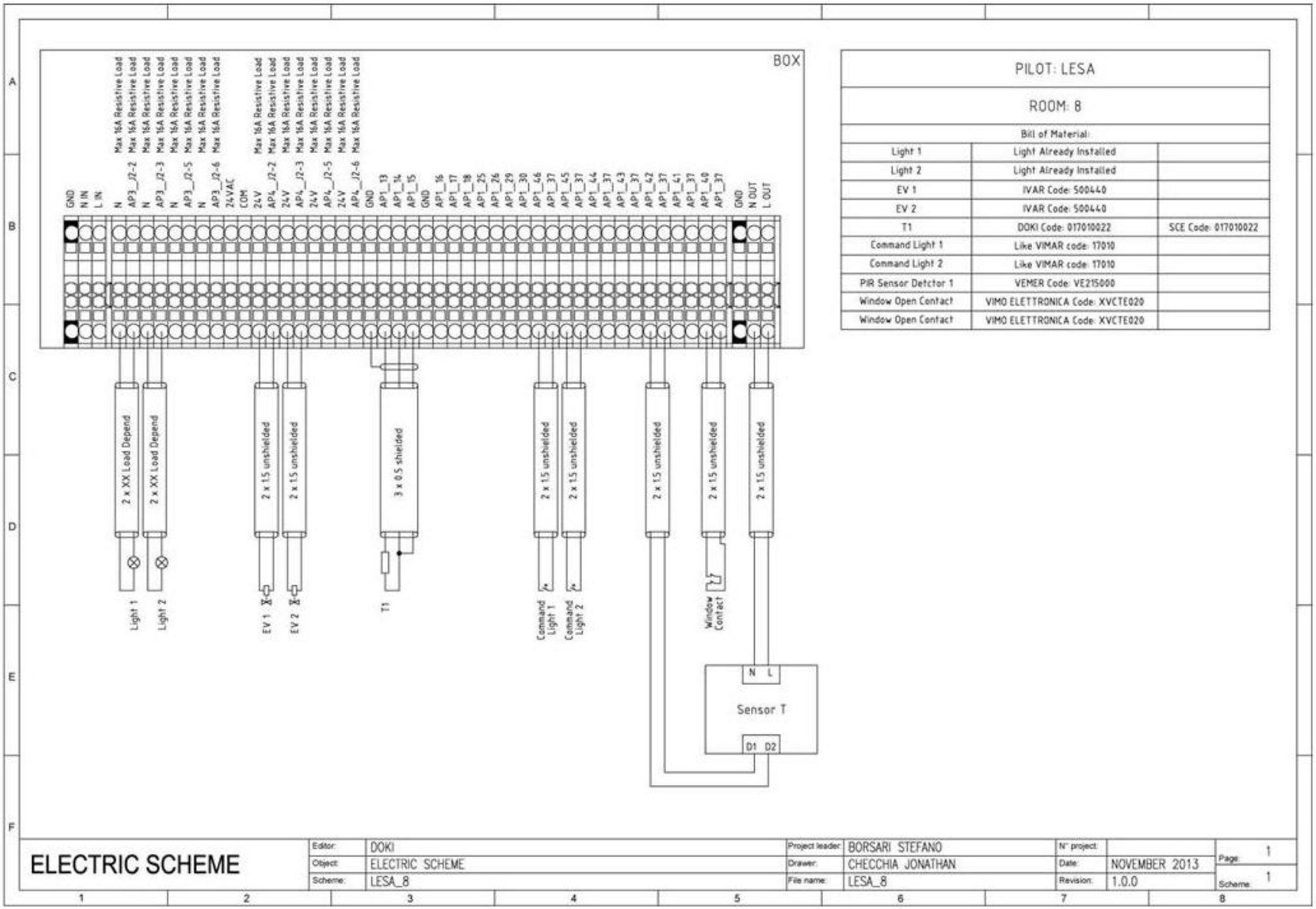


Figure 2-7: Wiring schema – Classroom #8

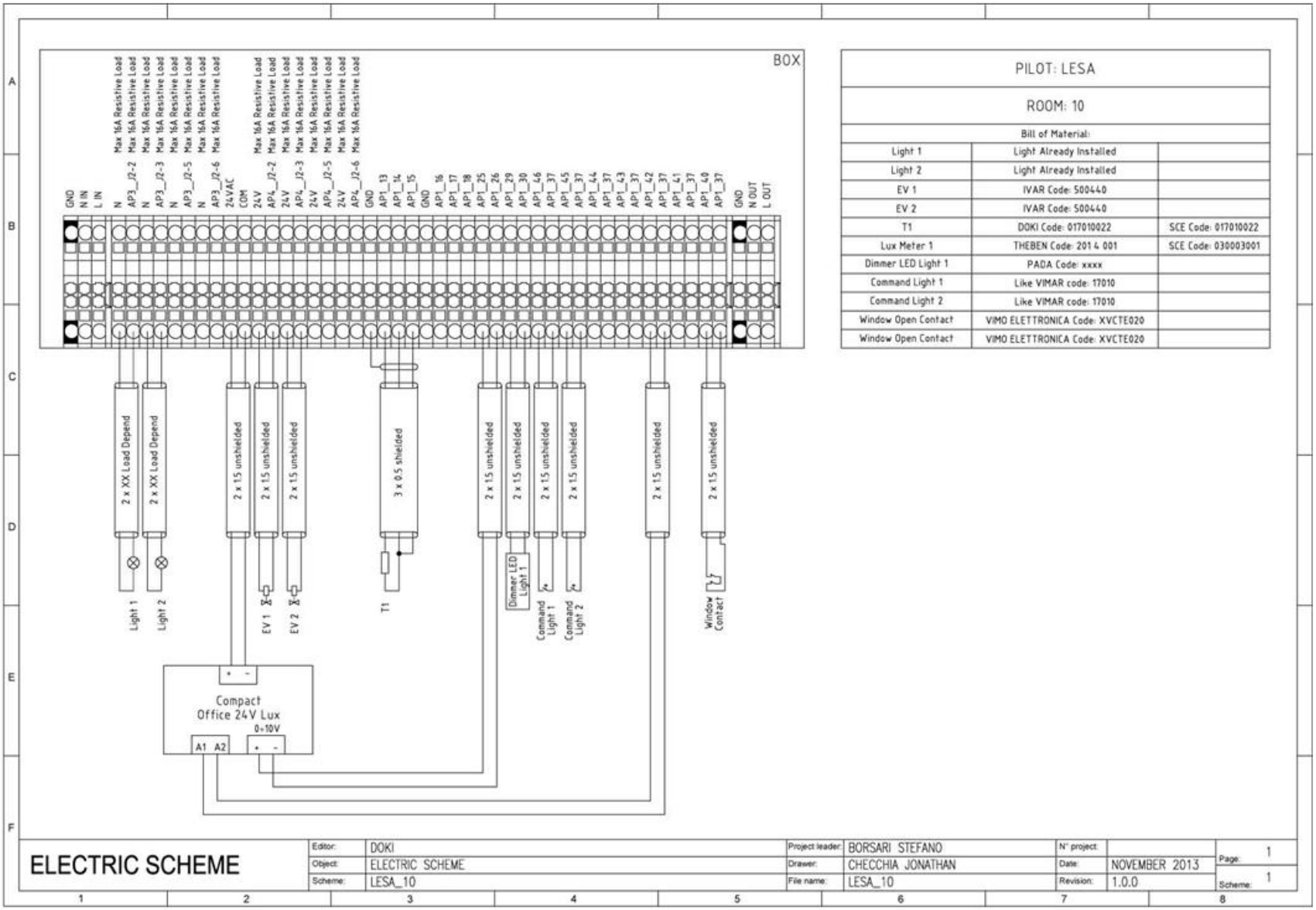


Figure 2-8: Wiring schema – Classroom #10

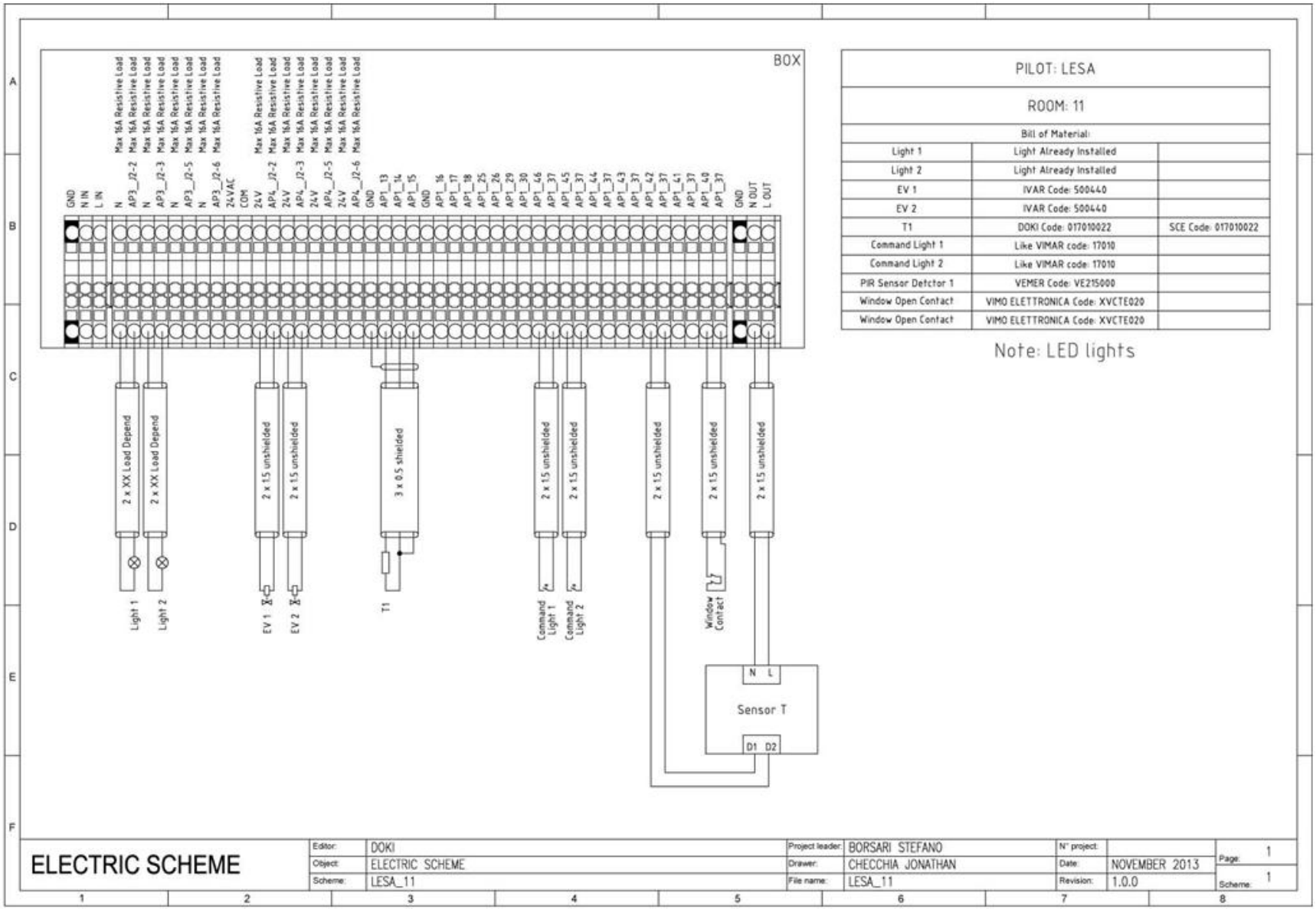


Figure 2-9: Wiring schema – Classroom #11

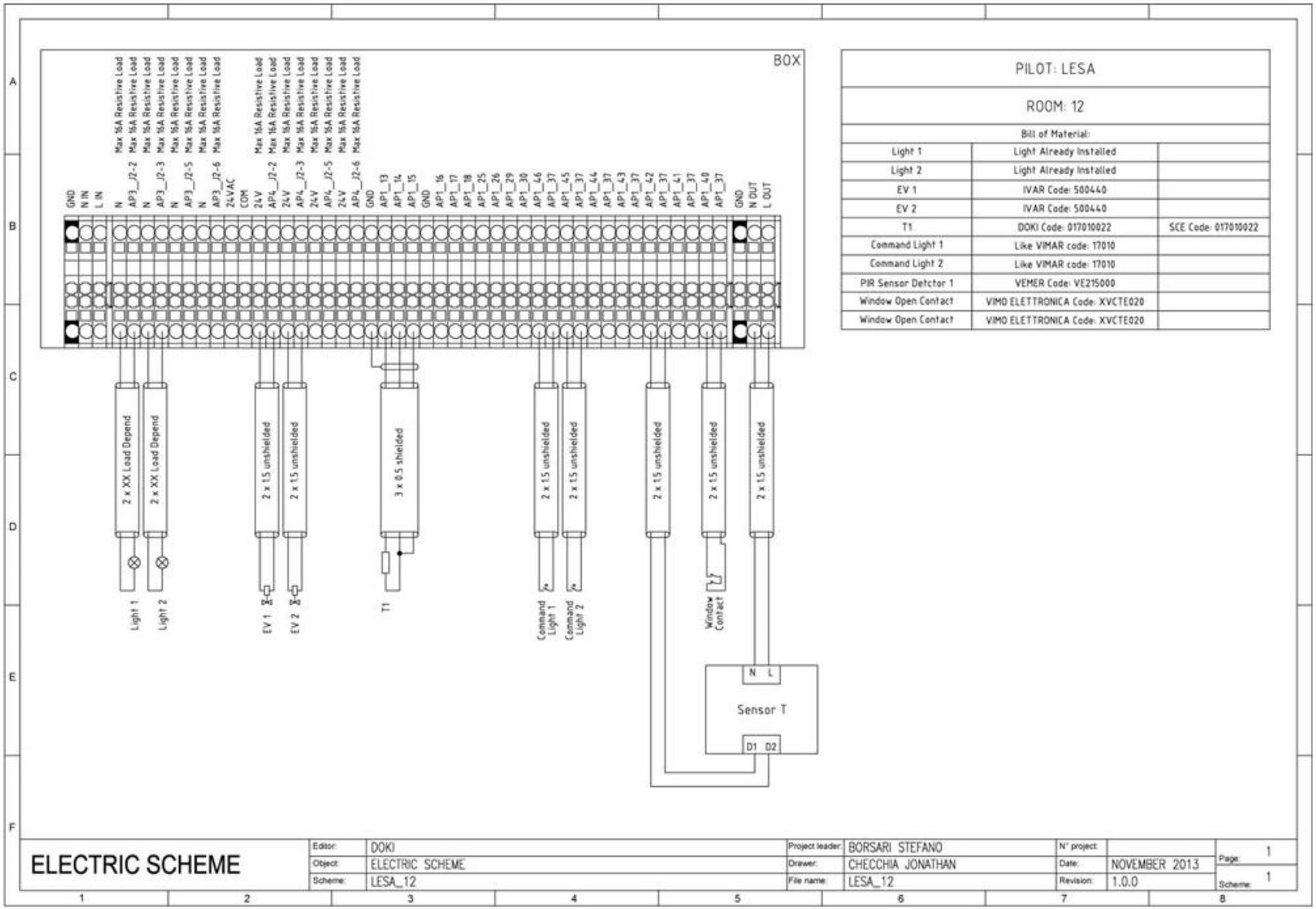


Figure 2-10: Wiring schema – Classroom #12

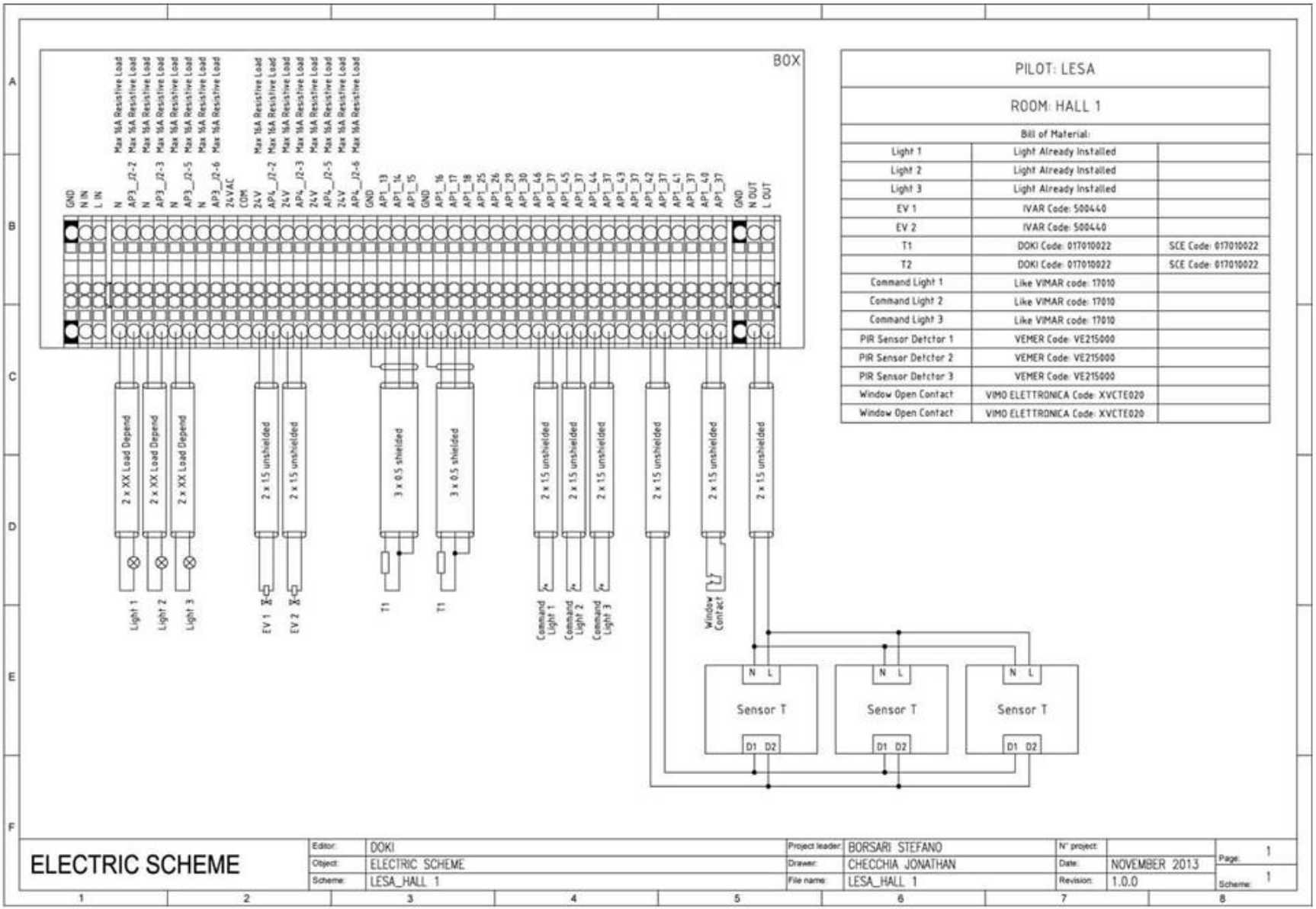


Figure 2-11: Wiring schema – Entrance, Lobby, Corridors

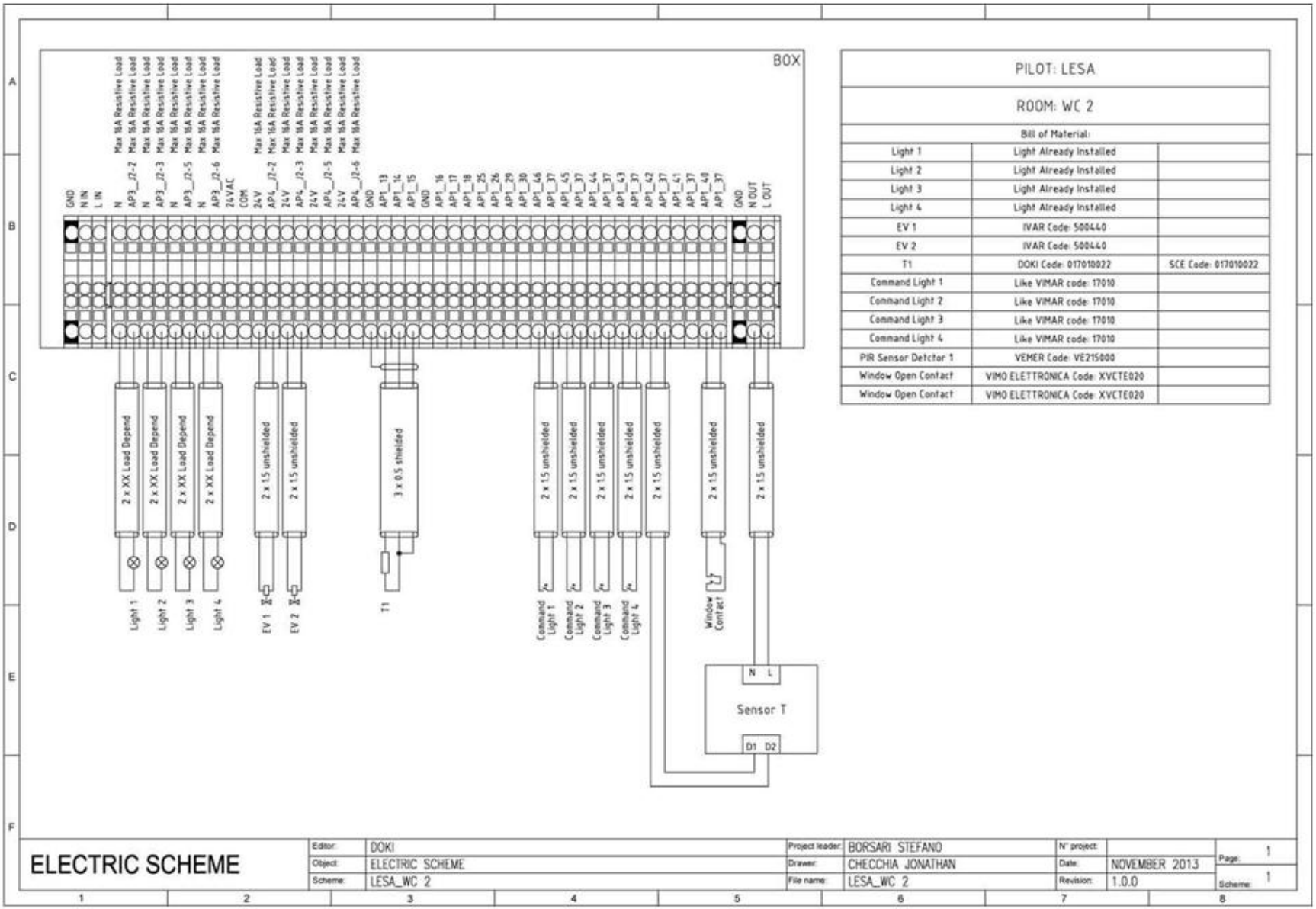


Figure 2-12: Wiring schema – WC #2

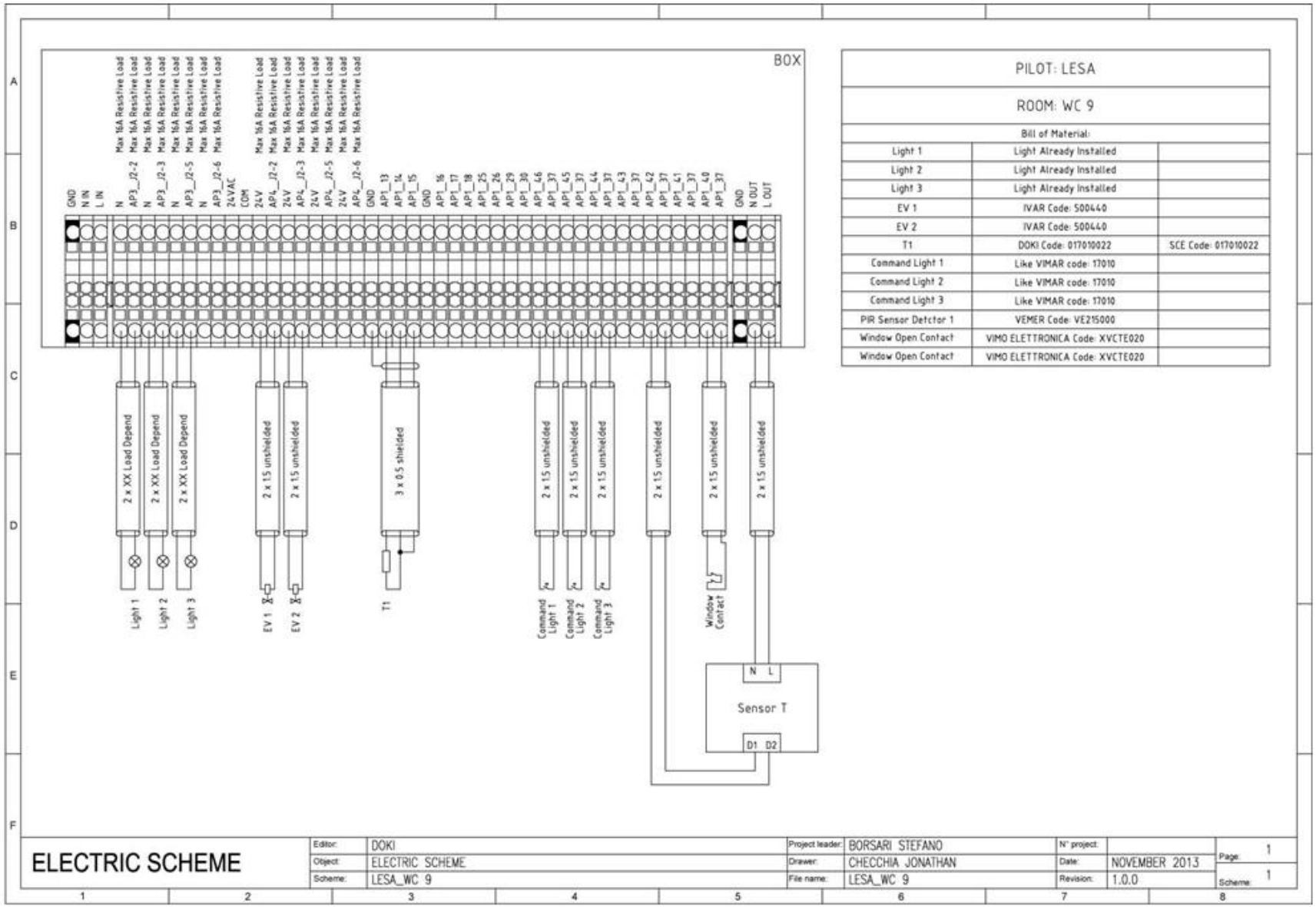


Figure 2-13: Wiring schema – WC #9

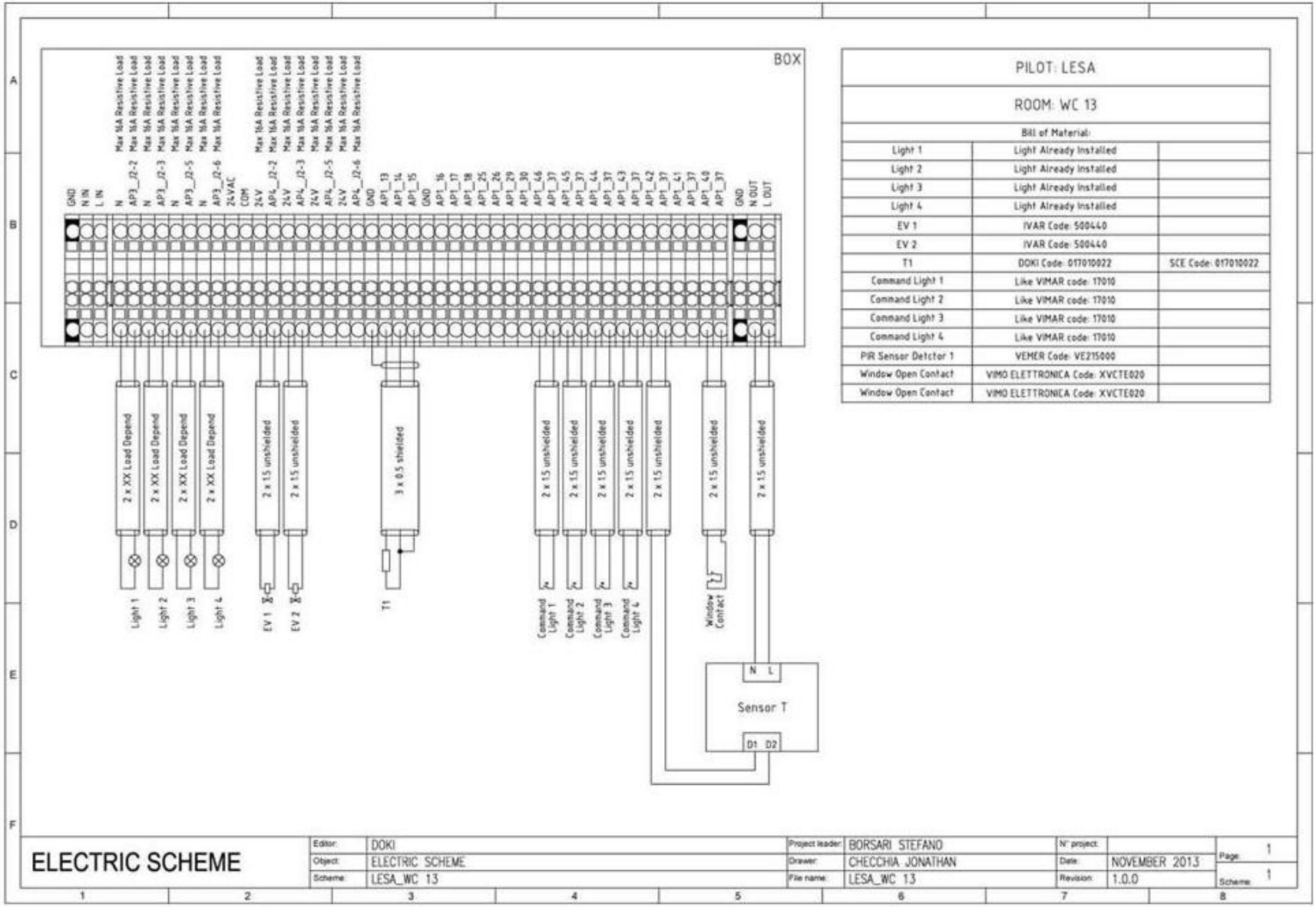


Figure 2-14: Wiring schema – WC #13

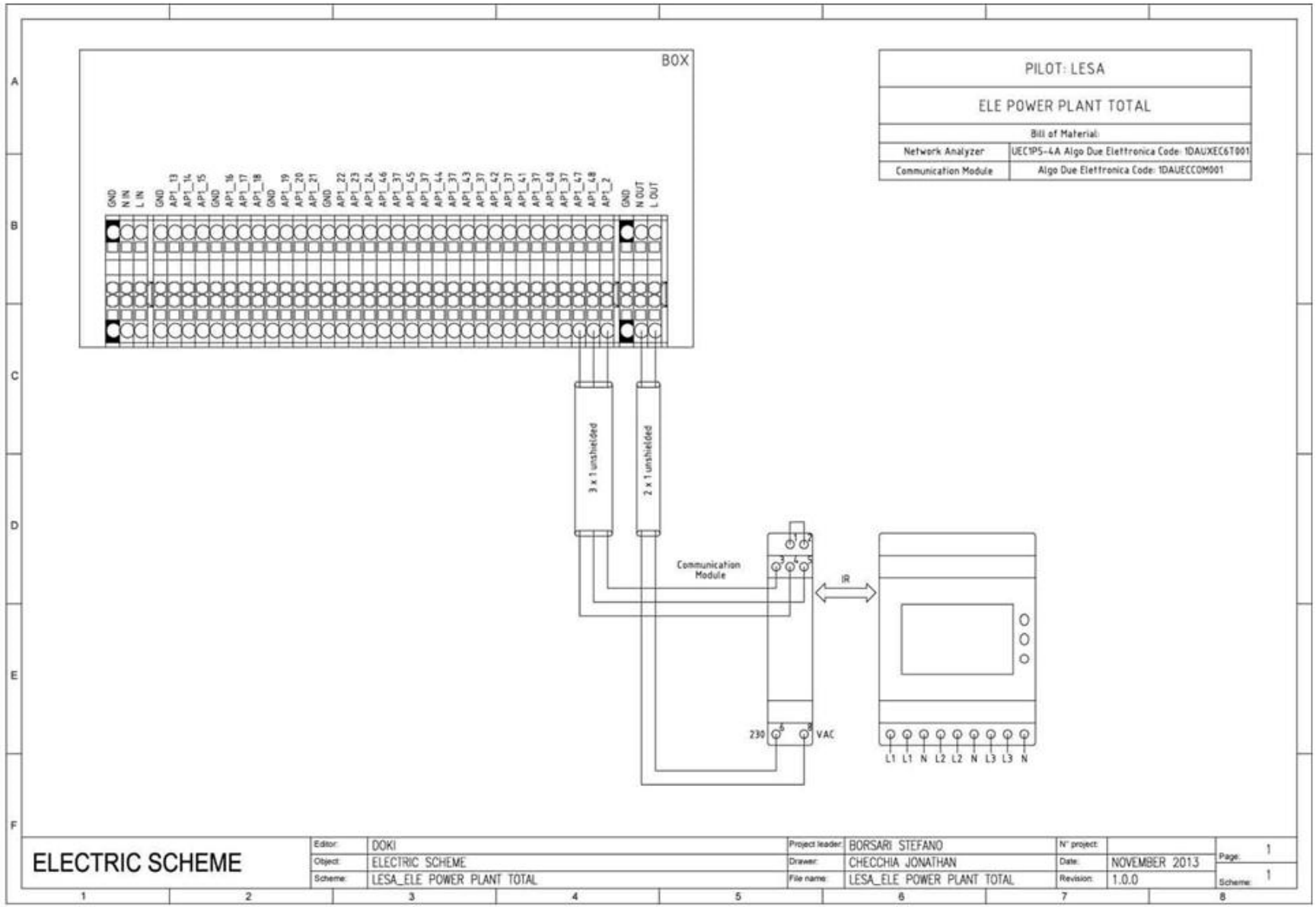


Figure 2-15: Wiring schema – Smart Meter School

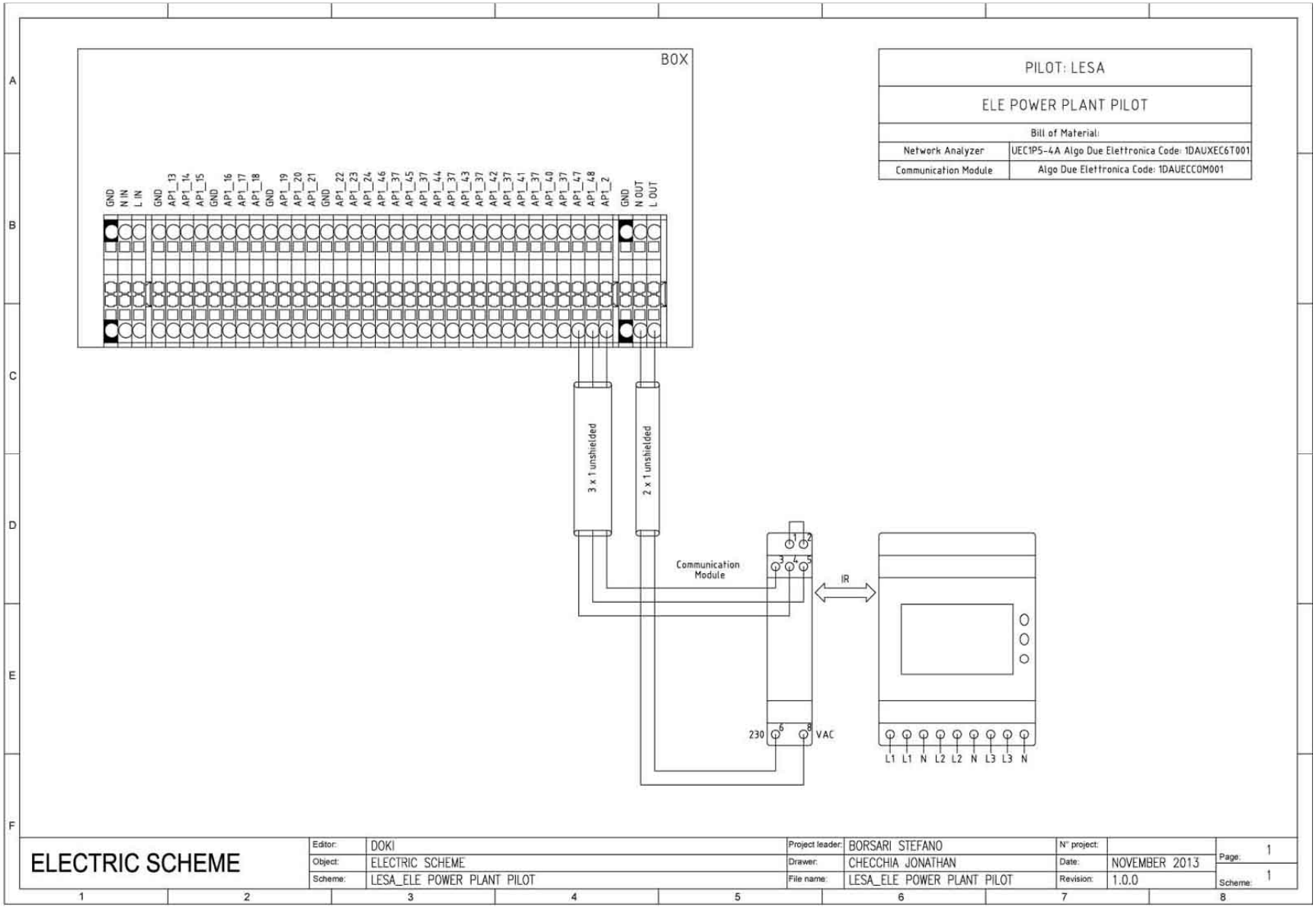


Figure 2-16: Wiring schema – Smart Meter Pilot

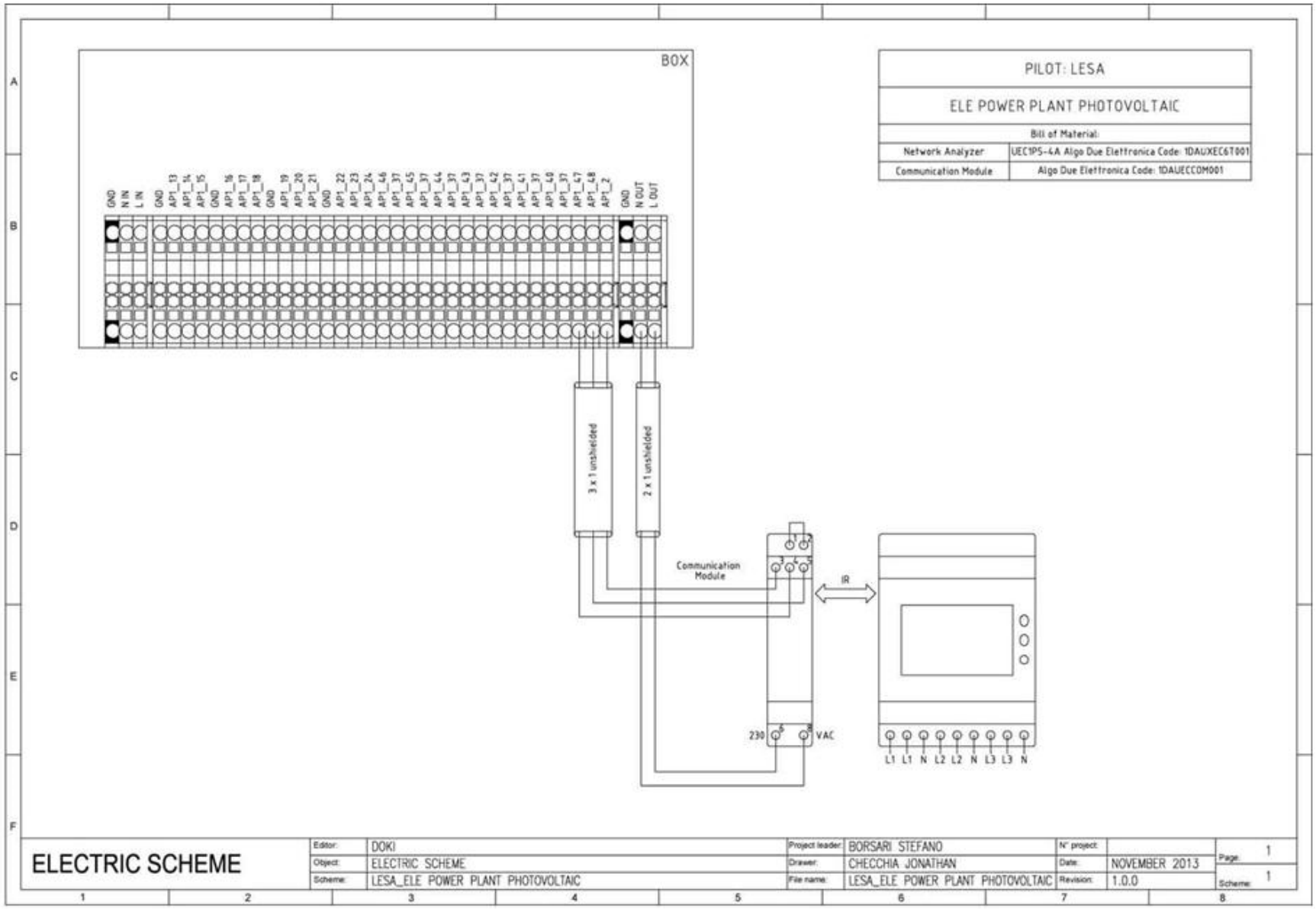


Figure 2-17: Wiring schema – Smart Meter PV Plant

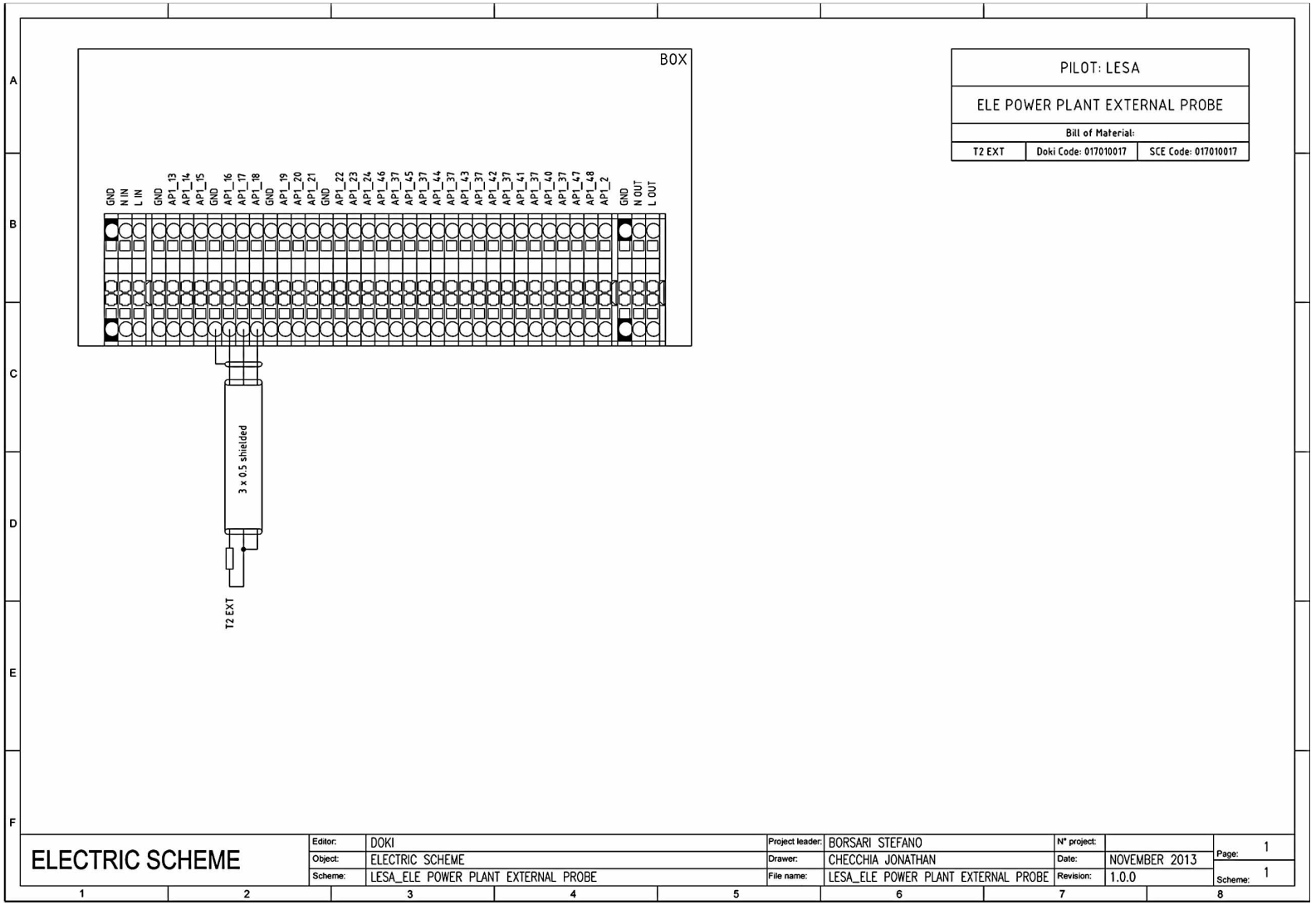


Figure 2-18: Wiring schema – External temperature sensor

2.2 Summary of Installed BEMS equipment in Pilot

Name	Description	Totals	C#03	C#04	C#05	C#06	C#07	C#08	C#10	C#11	C#12	WC#2	WC#9	WC#13	Hall	ELE Schol	ELE Pilot	ELE PV	Ext Temp
Temperature sensors	internal	**14**	1	1	1	1	1	1	1	1	1	1	1	1	2				
	external	**1**																	1
Valves		**25**	2	2	2	2	2	2	2	2	2	2	1	2	2				
Thermal meter		**0**																	
Window contacts Groups		**26**	2	2	2	2	2	2	2	2	2	2	2	2	2				
Presence detectors	Vemer	**18**	2	2	2			1		1	1	2	2	2	3				
Presence &Luxmeter	TheBens	**3**				1	1		1										
LED lamps	60W	**0**																	
LED lamps	30W	**28**				7	7	7	7										
LED lamps	16W	**0**																	
Exist. Lamps Groups		**29**	3	3	3			2		2	2	4	3	4	3				
Ele powerAnalyzer		**3**														1	1	1	
DOKI UNITS		**16**	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	

Notes:

- In Room C#08, LED lights have been installed without Light Intensity Measurer because there is no dimming control there.
  This was designed for comparing this LED configuration with the other Rooms (C#06, C#07 and C#10) equipped with LED and dimming control.
- EXT TEMP Unit is connected to a devoted EVO DOKI unit.

2.3 Specific points of the installation

The Lesa Municipality, which is offering local and remote assistance, and AESS staff cooperated actively with SCE-DOKI staff along all the technical activities.

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

1. Existing technological plants in the Lesa School were in line with local and National regulations.
2. Installation of BEMS was carried on by local technicians and specialists from DOKI, practically solving on the sites the needsof the installation and the solution of problems. BEMS Installation was carried out following the very datailed set of documentation for the 1st floor, comprehensive of the positions of valves, lights, sensors and windows.
3. The school communication infrastructure demonstrated poor quality of Internet connection, creating troubles and instability in the communication. The DOKI PC SW was upgraded to control this type of problems and the Municipality was invited to help supplying a separate ADSL connection.
4. As the existing Heating Energy Generation System (HEGS) is about 40 years old, and a refurbishment (substitution) has been programmed in the near future, the installation of the smart thermal meter in the boiler house led to a great concern, because:.
   - there was not enough space to install the meter and, in any case, a radical change of existing layout is requested;
   - pipes are very old, with the risk that the smart meter can't be fixed and supported;
   - due to the exsisting network and layout, the smart meter can measures only the Pilot heating consumption, and not those for the entire school;
   - The Municipality shows availability to give the authorization for doing the work only if a conformity certificate will be issued;
   - The smart meter installation revealed to be expensive, with an estimated cost of about 7 ÷ 8 k€, and completed no less than two months from the start of the work. Considering that the survey was performed in July 2013, the holiday period in August and the start of the heating season in October, the Municipality considered the two months work request as a non-guarantee for the school activities;
   - The Municipality is evaluating to refurbish the entire boiler house probably in the 2014 summer .So, also doing the smart thermal meter installation, it will be removed before the end of the VERYSchool project;
   - The Municipality explicitly told to be against the solution of installing the meter.

   Because of these problems, **the Consortium agreed not to install the smart thermal meter** and to proceed with the estimation of thermal energy consumption (the indirect method proposed by DAPP for IPMVP) by means of calculations for Pilot's spaces and the entire Pilot; indeed, for the entire school the overall thermal consumption will be taken from the bills.
5. Heating distribution system (radiators) was transformed using on-off valves on all radiators; valves are from the brand IVAR.
6. The external temperature sensor was found on the building and the measurement is achieved using the Ethernet network of the school.
7. The LED technology has been considered in four classrooms for replacing exsisting fluorescent lamps: three of them with a dimming control and one with ON/OFF control. Quality of installation was particularly satisfactory, as wiring was hidden in the ceiling avoiding external cabling.
   The light produced by the new LED lamps was considered very comfortable both from the installer and the school manager; people living the school perceived that the indoor lighting levels were higher than those provided by the replaced fluorescents lamps, while the light colour better approaches the sunlight spectrum.

The lighting configuration is described in the table below.

ROOM	Description	Notes	
1	Atrium	11 square lamps	
2	WC		
3	Classroom	3 fluorescent lamps	
4	Classroom	3 fluorescent lamps	
5	Classroom	3 fluorescent lamps	
6	Classroom	3 fluorescent lamps	Substituted by LEDs: 7x30Watts
7	Classroom	3 fluorescent lamps	Substituted by LEDs: 7x30Watts
8	Classroom	3 fluorescent lamps	Substituted by LEDs: 7x30Watts
9	WC	2 incandescent lamps	
10	Classroom	3 fluorescent lamps	Substituted by LEDs: 7x30Watts
11	Classroom	3 fluorescent lamps	
12	Classroom	3 fluorescent lamps	
13	WC	2 incandescent lamps	
14	Atrium/stairs	Some fluorescent and some energy efficient lamps	

8. Three smart electricity meters have been installed:
   - the first one to measure for the School electricity consumptions and power (both active and reactive), current oand voltage on the three phases;
   - the second one to provide the same measurement for the Pilot area;
   - the third one to measure the energy production of the school photovoltaic plant.

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 planimetry representation 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 Lesa planimetry representation is obtained on one screen, but with two different displays.

- the first one offers a lighting map of the Pilot with the status of the lights in all rooms. Where numbers exsist they mean a lighting meter has been installed in the room and the light can be regulate acting on the electrical power (dimming); in the other cases the lamps are ON/OFF controlled.

Figure 3-1 Lesa Pilot Planimetry: map of lighting state

- the second one shows the measured temperature in all rooms in [°C].

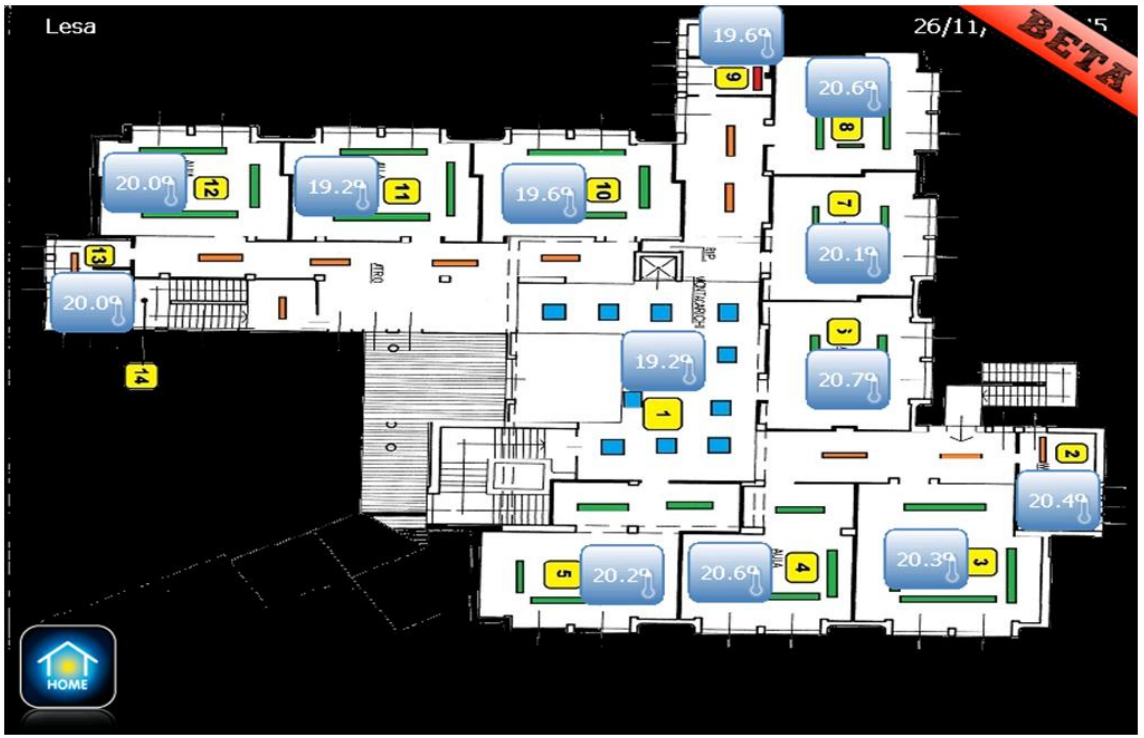


Figure 3-2 Lesa Pilot Planimetry: map of temperatures

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.

Experience demonstrated that this type of representation cannot be easily extended to all possible configurations of layouts of the pilots. For the other 3 Pilots a new interface was developed and standardized.

Since the intent is for providing a **user manual**, this section is edited in Italian language for a better understanding and ease to use by LESA staff.
The same contents are written in English for Plovdiv (Annex C) and Lisbon (Annex D).

3.1 Web Access

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

3.1.1 Accesso Tramite Web

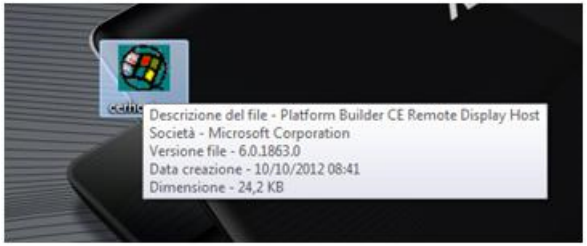
Il seguente documento illustra la procedura da eseguire per effettuare l'accesso via internet al sistema VERYSchool in cui è possibile regolare la temperatura di ogni ambiente del piano superiore della scuola (aule, bagni, Atrio). Esistono due modi il primo è digitare il seguente indirizzo nel browser:

http://88.43.45.28:5800

Questo però richiede l'installazione di Java se non già installato nel PC (http://www.java.com/it/download/) ed essendo da browser può essere soggetto ad interruzioni di connessione. (E' necessario accettare tutte le richieste di sicurezza che windows può richiedere per avviare la connessione). Apparirà una piccola finestra in cui basterà selezionare OK per avviare la connessione.

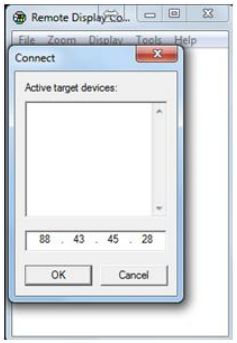
Il secondo è illustrato di seguito:

Avviare il programma Cerhost.exe



Si aprirà una finestra su cui è necessario premere in alto a sinistra la scritta File.

Selezionare Connect, apparirà la seguente finestra in cui bisogna digitare il seguente **indirizzo IP: 88.43.45.28**



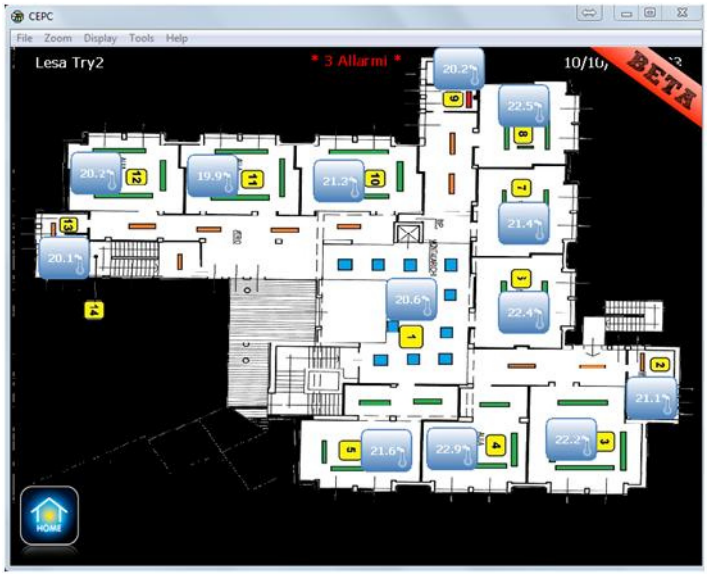
Selezionare OK. Dopo qualche secondo si aprirà una finestra in cui comparirà la visualizzazione del PC.

Descrizione d'uso

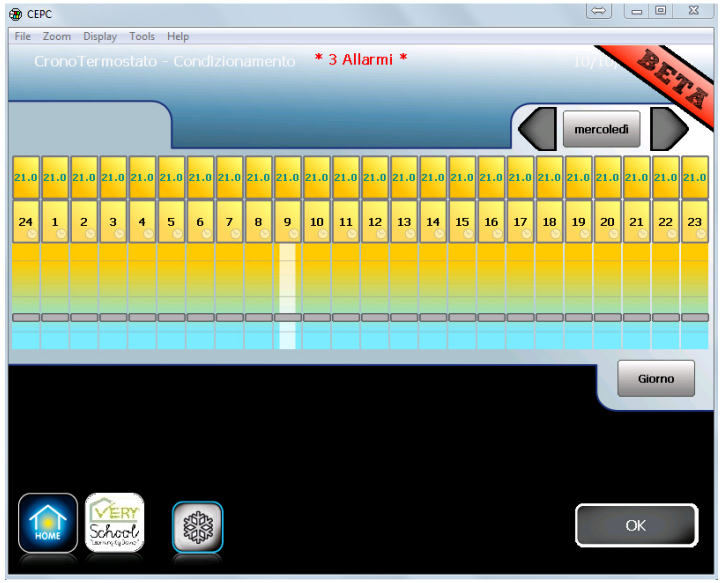
A questo punto è possibile utilizzare il PC come se si fosse in loco, ci si troverà da qui in poi nella medesima situazione, indipendentemente da quale dei metodi di collegamento si è scelto. Nella schermata principale sono visibili gli allarmi informano di qualche eventuale malfunzionamento, e, soprattutto, se le finestre di qualche ambiente sono aperte, come illustrato nell'immagine di sopra.

Tramite il primo tasto a partire da sinistra "VERYSchool" è possibile accedere al menu di regolazione climatica e a quello di Luci. Quest'ultimo permette di accendere e spegnere le luci, ma consigliamo di non modificarne lo stato cliccando sulle icone in quanto sono dotate di funzionamento automatico, come illustrato nel relativo documento. Nella pagina che si visualizza premendo il pulsante "VERYSchool" si deve selezionare il menu comfort o il menu luci:

Menu di gestione delle luci: Selezionale il tasto più a destra per regolare la temperatura:



Premendo su una delle temperature è possibile entrare nel cronotermostato 24 / 24, 7 / 7.



Ogni ora è regolabile mediante la sua barra trascinandola verso l'alto (aumento temperatura set point) o verso il basso (riduzione temperatura set point). Premendo sul tasto dove è scritto il giorno (nell'immagine sopra mercoledì) è possibile selezionare tutta la settimana (comparirà la scritta Week) oppure, premendo le frecce, selezionare il giorno di interesse.

Inoltre è possibile selezionare una fascia oraria scorrendo col cursore e il tasto sinistro del mouse premuto, in questo modo è possibile modificare tutta la fascia oraria selezionata. Premendo Week e Giorno si modificherà, con un solo movimento, tutto il cronotermostato settimanale.

Per selezionare la stagione è necessario premere il tasto in basso a sinistra in cui è rappresentato il fiocco di neve.

 Estate

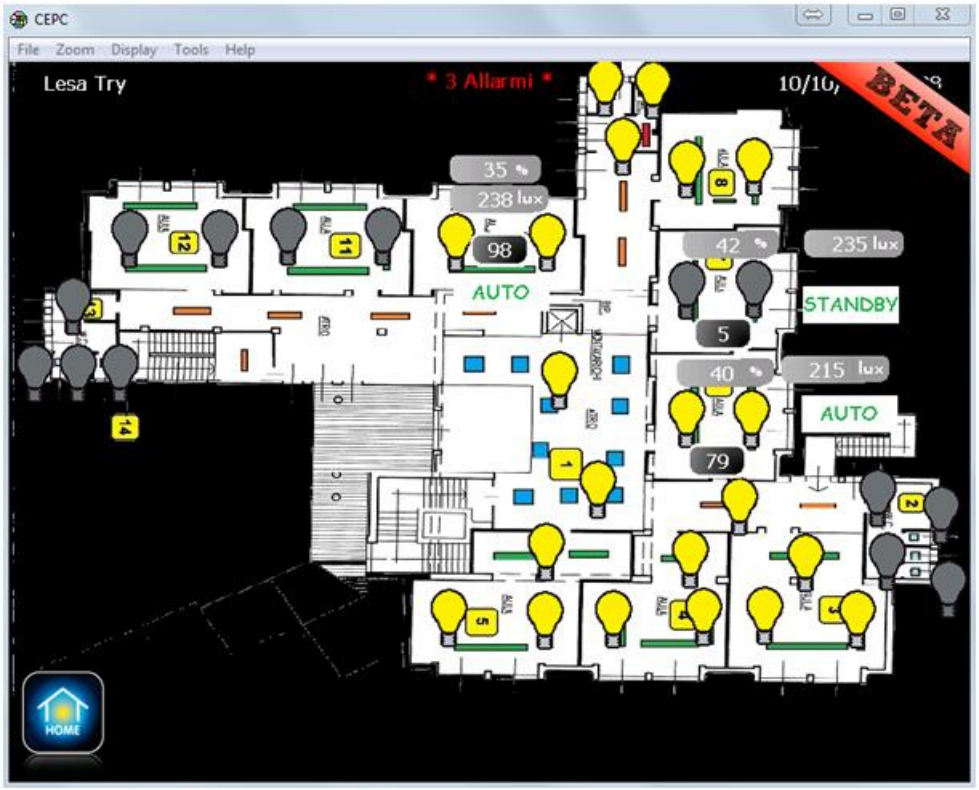
 Inverno

 Spento

Per cambiare la stagione in tutta la settimana è necessario selezionare prima Week e poi inserire la stagione desiderata. Allo stesso modo è necessario agire per spegnere l'impianto (mezza stagione).

N.B. Per confermare qualsiasi operazione è necessario premere il tasto OK in basso a destra della pagina.

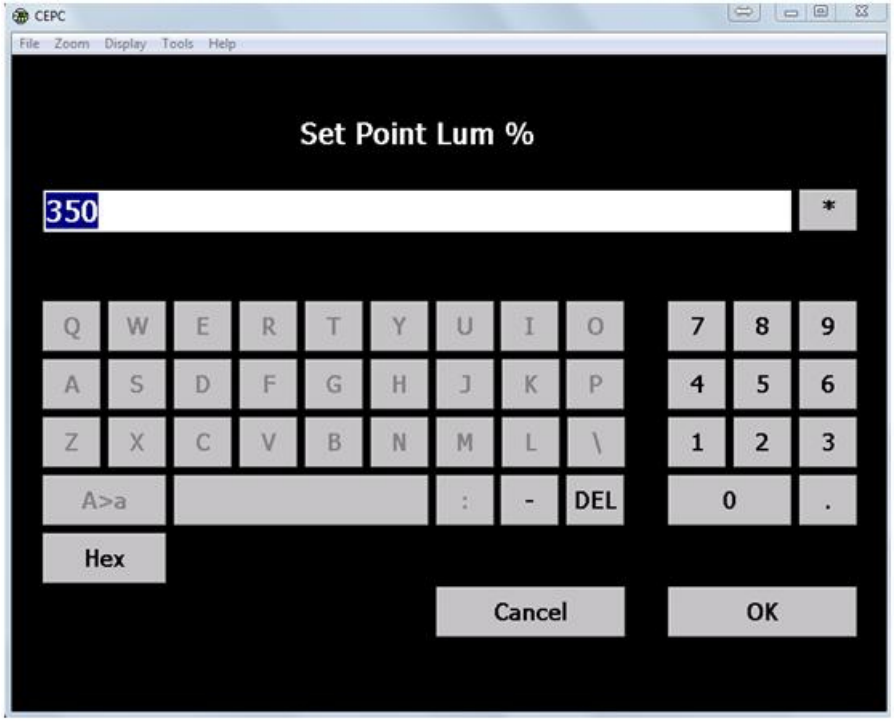
Menu di gestione delle luci:



Il valore illustrato in percentuale rappresenta il set point di luminosità, corrispondente al numero espresso in lux di sotto o di fianco. Es. 35% corrisponde a 238 lux. I valori sono diversi per ogni sensore in quanto per ognuno di essi è stata eseguita una taratura. L'unico modificabile è il valore in percentuale, cliccandoci sopra apparirà una finestra con una tastiera numerica (mostrata successivamente) in cui inserire il valore desiderato. Questo valore è espresso in decimi di percentuale, pertanto per modificarlo occorre scrivere ad esempio 400 per ottenere il 40%. Il set point in percentuale serve al sistema per decidere se accendere una nessuna o entrambe le luci. Nel momento in cui si disponesse di luci dimmerate l'intensità luminosa delle stesse sarà regolata in base a set point e alla luminosità rilevata dal sensore in ambiente. Il numero scritto nello spazio grigio più scuro ed in continua variazione rappresenta i lux rilevati all'interno di ogni aula in quel preciso istante grazie al sensore ambiente posizionatovi. Tutte queste informazioni sono disponibili solo per le aule "evolute" in cui sono stati installati i sensori di luminosità.

E' visibile inoltre lo stato di funzionamento dell'aula: Auto = Automatico, Man = Manuale e Stand-By = Luci spente senza presenza rilevata in aula.

Infine lo stato di ogni luce è visibile (luce gialla accesa,luce grigia spenta) e premendo sulla lampadina è possibile modificarne lo stato. Questo però sospende il funzionamento automatico della stessa, è consigliabile quindi non utilizzarlo. Tale funzionamento è descritto nel relativo manuale.



Premendo il tasto Cancel si ritorna alla pagina precedente senza effettuare alcuna modifica al valore precedente.

Menu di gestione dei Consumi energetici.
Si attiva selezionando dalla pagina principale i seguenti tasti:

 e nella pagina successiva  , si accede al menu dei consumi elettrici del primo piano in cui sono visibili i dati illustrati nell'immagine successiva (il piano terra sarà collegato al più presto):

Qui non si ha interazione è solo possibile visualizzare le informazioni riportate.

3.1.2 Accesso Tramite Rete Locale

La procedura è la medesima illustrata da remoto ma l'indirizzo IP da scrivere è il seguente: **192.168.1.253**. Si può anche accedere digitando sul browser il seguente indirizzo: http://192.168.1.253:5800

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	*Class Room #3*	7	17	72	**96**	1	2		2	3	1		
	Class Room #4	8	18	72	**98**	1	2		2	3	1		
	Class Room #5	8	18	72	**98**	1	2		2	3	1		
	Class Room #6 (with LED & dimming)	4	15	81	**100**	1	1	1	2	1	1		
	Class Room #7 (with LED & dimming)	4	15	81	**100**	1	1	1	2	1	1		
	Class Room #8 (with LED)	5	13	60	**78**	1	1		2	1	1		
	Class Room #10 (with LED & dimming)	4	15	81	**100**	1	1	1	2	1	1		
	Class Room #11	6	15	66	**87**	1	1		2	2	1		
	Class Room #12	6	15	68	**89**	1	1		2	2	1		
Bath Rooms	*WC #2*	8	19	78	**105**	1	1		2	4	1		
	WC #9	6	14	66	**86**	1	1		1	3	1		
	WC #13	8	19	78	**105**	1	1		2	4	1		
Hall	*Entrance, Lobby, Corridors*	9	20	78	**107**	1	2		2	4	1		
General	*Meteo data*	0	1	6	**7**	1							
	Pilot: Electrical Measurement	0	10	40	**50**							1	
	School: Electrical & Thermal Measurement	0	10	31	**41**							1	
	Renewable Energy: PV Plant	0	1	7	**8**							1	
TOTAL		**83**	**235**	**1.037**	**1.355**	**14**	**17**	**3**	**25**	**32**	**13**	**3**	**0**

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

4.2 Room Tables.

	Label	Class Room #3	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.30 - Data received by DOKI - Data Transmission = 5 minutes.
1	LECL003ALILIFLUC01	Lighting: Status Circuit 1	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	LECL003ALIMINLIM01	Lighting: Minutes ON Circuit 1	minutes		1		1	Cumulative in the hour
3	LECL003ALIHOULIM01	Lighting: Hours ON Circuit 1	hours		1		1	Cumulative from the installation
4	LECL003ALILIFLUC02	Lighting: Status Circuit 2	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
5	LECL003ALIMINLIM02	Lighting: Minutes ON Circuit 2	minutes		1		1	Cumulative in the hour
6	LECL003ALIHOULIM02	Lighting: Hours ON Circuit 2	hours		1		1	Cumulative from the installation
7	LECL003ALILIFLUC03	Lighting: Status Circuit 3	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
8	LECL003ALIMINLIM03	Lighting: Minutes ON Circuit 3	minutes		1		1	Cumulative in the hour
9	LECL003ALIHOULIM03	Lighting: Hours ON Circuit 3	hours		1		1	Cumulative from the installation
10	LECL003OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES; **there is a second sensor presence in parallel.**
11	LECL003ATIROOTEM01	Room Temperature	°C		1		1	
12	LECL003ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
13	LECL003RADMINVEC01	Radiator 1: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
14	LECL003RADMINVAM01	Radiator 1: Minutes ON	minutes		1		1	Cumulative in the hour
15	LECL003RADHOUVAM01	Radiator 1: Hours ON	hours		1		1	Cumulative from the installation
16	LECL003RADMINVEC02	Radiator 2: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
17	LECL003RADMINVAM02	Radiator 2: Minutes ON	minutes		1		1	Cumulative in the hour
18	LECL003RADHOUVAM02	Radiator 2: Hours ON	hours		1		1	Cumulative from the installation
19	LECL003RADPIDORC01	Radiators: Control signal	%		1		1	**PID < 33% R1 & R2 = OFF; 34% < PID < 66% R1 = ON & R2 = OFF; PID > 66% R1 & R2 ON**
20	LECL003WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
21	LECL003OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic**; **1 = manual**; **2 = stand-by**.
22	LECL003RADTHRADS01	Threshold Radiator 1	%		1		1	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
23	LECL003RADTHRADS02	Threshold Radiator 2	%		1		1	Set-Point to switch ON/OFF Valve 2. **used by IES only to calibrate the building model**
24	LECL003ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				7	**17**	**0**	**24**	

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	**LECL003ALIMINLIH01**	Lighting: Minutes ON Circuit 1	minutes	1	1	1	**3**	ABS (last value - first value) of **LECL003ALIMINLIM01** in the specific time interval
2	**LECL003ALIMINLIH02**	Lighting: Minutes ON Circuit 2	minutes	1	1	1	**3**	ABS (last value - first value) of **LECL003ALIMINLIM02** in the specific time interval
3	**LECL003ALIMINLIH03**	Lighting: Minutes ON Circuit 3	minutes	1	1	1	**3**	ABS (last value - first value) of **LECL003ALIMINLIM03** in the specific time interval
4	**LECL003ATIROOTEH01**	Room Temperature	°C	1	1	1	**3**	Average among all value of **LECL003ATIROOTEM01** in the specific time interval
5	**LECL003ATISPTEMH01**	Set-Point Room Temperature	°C	1	1		**2**	Last value of **LECL003ATIROOTES01** in the specific time interval.
6	**LECL003OCCPRESEH01**	Presence Sensor	minutes	1	1	1	**3**	[Number of events that **LECL003OCCPRESEM01 > 0**] * **5 [minutes]**, in the specific time interval
7	**LECL003RADMINVAH01**	Radiators: Minutes ON Valve 1	minutes	1	1	1	**3**	ABS (last value - first value) of **LECL003RADMINVAM01** in the specific time interval
8	**LECL003RADMINVAH02**	Radiators: Minutes ON Valve 2	minutes	1	1	1	**3**	ABS (last value - first value) of **LECL003RADMINVAM02** in the specific time interval
9	**LECL003WINWIOPEH01**	Windows: Minutes Opened	minutes	1	1	1	**3**	[Number of events that **LECL003WINWIOPEM01 > 0**] * 5 [minutes], in the specific time interval

	Label	Class Room #3	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.30 - Data received by DOKI - Data Transmission = 5 minutes.
10	**LECL003ALIERGCOH01**	Lighting Energy Consumption	kWh	1	1	1		**[Circuit1] + [Circuit2] + [Circuit3]. TotalWatt = (9 * 1 * 58W) = 522 [Watt]** **Circuit1 = [LECL003ALIMINLIH01 * TotalWatt_C1]/1000; TotalWatt_C1 = (2 x 1 x 58W) = 116 [Watt]** **Circuit2 = [LECL003ALIMINLIH02 * TotalWatt_C2]/1000; TotalWatt_C2 = (3 x 1 x 58W) = 174 [Watt]** **Circuit3 = [LECL003ALIMINLIH03 * TotalWatt_C3]/1000; TotalWatt_C3 = (4 x 1 x 58W) = 232 [Watt]**
11	**LECL003THCENRGYH01**	Thermal Energy Consumption	kWh	1	1	1		**[(LECL003RADMINVAM01 + LECL003RADMINVAM02) * NominalPower]/1000;** **NominalPower = 1420 [Watt]**
12	**LECL003ATITHTSPH01**	"Tamb>Set-point & Heating ON"	events	1	1	1		[**LECL003ATIROOTEM01>LECL003ATIROOTEM01**] AND [**LECL003RADMINVAH01>0 OR LECL003RADMINVAH02>0**]
13	**LECL003WINWOAHOH01**	"Window Open & Heating ON"	events	1	1	1		[**(LECL003WINWIOPEH01 > 0) AND (LECL003RADMINVAH01 > 0 OR LECL003RADMINVAH02 > 0)**]
14	**LECL003OCCROWOWH01**	"BMS not in automatic control"	events	1	1	1		[**(LECL003OCCROWOWM01 <> 0)**] in the specific time interval
15	**LECL003ALILOANOH01**	"Light ON & no occupancy"	events	1	1	1		[**(LECL003ALIMINLIH01 > 0 OR LECL003ALIMINLIH02 > 0 OR LECL003ALIMINLIH03 > 0) AND (LECL003OCCPRESEH01 = 0)**]
16	**LECL003THCFTHSOH01**	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
17	**LECL003THCLTHSOH01**	Last time heating system OFF	timestamp			1		The last time the heating system is turned OFF during the whole day.
			TOTALS	**15**	**15**	**16**	**26**	
				72				

Figure 4-2: Classroom #3 - physical measurement and HQDS variables.

	Label	Class Room #4	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.31 - Data received by DOKI - Data Transmission = 5 minutes.
1	LECL004ALILIFLUC01	Lighting: Status Circuit 1	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	LECL004ALIMINLIM01	Lighting: Minutes ON Circuit 1	minutes		1		1	Cumulative in the hour
3	LECL004ALIHOULIM01	Lighting: Hours ON Circuit 1	hours		1		1	Cumulative from the installation
4	LECL004ALILIFLUC02	Lighting: Status Circuit 2	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
5	LECL004ALIMINLIM02	Lighting: Minutes ON Circuit 2	minutes		1		1	Cumulative in the hour
6	LECL004ALIHOULIM02	Lighting: Hours ON Circuit 2	hours		1		1	Cumulative from the installation
7	LECL004ALILIFLUC03	Lighting: Status Circuit 3	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
8	LECL004ALIMINLIM03	Lighting: Minutes ON Circuit 3	minutes		1		1	Cumulative in the hour
9	LECL004ALIHOULIM03	Lighting: Hours ON Circuit 3	hours		1		1	Cumulative from the installation
10	LECL004OCCPRESEM01	Presence Sensor 1	yes / no	1			1	0 = NO; 1 = YES. **It controls the lights in the classroom.**
11	LECL004OCCPRESEM02	Presence Sensor 2	yes / no	1			1	0 = NO; 1 = YES. **It controls the lights in the pre-room.**
12	LECL004ATIROOTEM01	Room Temperature	°C		1		1	
13	LECL004ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
14	LECL004RADMINVEC01	Radiator 1: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
15	LECL004RADMINVAM01	Radiator 1: Minutes ON	minutes		1		1	Cumulative in the hour
16	LECL004RADHOUVAM01	Radiator 1: Hours ON	hours		1		1	Cumulative from the installation
17	LECL004RADMINVEC02	Radiator 2: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
18	LECL004RADMINVAM02	Radiator 2: Minutes ON	minutes		1		1	Cumulative in the hour
19	LECL004RADHOUVAM02	Radiator 2: Hours ON	hours		1		1	Cumulative from the installation
20	LECL004RADPIDORC01	Radiators: Control signal	%		1		1	**PID < 33% R1 & R2 = OFF; 34% < PID < 66% R1 = ON & R2 = OFF; PID > 66% R1 & R2 ON**
21	LECL004WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
22	LECL004OCCROWOWM01	Room Control Status: 1	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.** It refers to the classroom.
23	LECL004OCCROWOWM02	Room Control Status: 2	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.** It refers to the pre-room.
24	LECL004RADTHRADS01	Threshold Radiator 1	%		1		1	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
25	LECL004RADTHRADS02	Threshold Radiator 2	%		1		1	Set-Point to switch ON/OFF Valve 2. **used by IES only to calibrate the building model**
26	LECL004ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				8	**18**	**0**	**26**	

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	LECL004ALIMINLIH01	Lighting: Minutes ON Circuit 1	minutes	1	1	1	3	ABS (last value - first value) of **LECL004ALIMINLIM01** in the specific time interval
2	LECL004ALIMINLIH02	Lighting: Minutes ON Circuit 2	minutes	1	1	1	3	ABS (last value - first value) of **LECL004ALIMINLIM02** in the specific time interval
3	LECL004ALIMINLIH03	Lighting: Minutes ON Circuit 3	minutes	1	1	1	3	ABS (last value - first value) of **LECL004ALIMINLIM03** in the specific time interval
4	LECL004ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **LECL004ATIROOTEM01** in the specific time interval
5	LECL003ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **LECL004ATIROOTES01** in the specific time interval.
6	LECL004OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	[Number of events that (**LECL004OCCPRESEM01>0 OR LECL004OCCPRESEM02>0**)] *** 5 [minutes]**
7	LECL004RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	3	ABS (last value - first value) of **LECL004RADMINVAM01** in the specific time interval
8	LECL004RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	3	ABS (last value - first value) of **LECL004RADMINVAM02** in the specific time interval
9	LECL004WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **LECL004WINWIOPEM01 > 0**] * 5 [minutes], in the specific time interval

	Label	Class Room #4	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.31 - Data received by DOKI - Data Transmission = 5 minutes.
10	LECL004ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**[Circuit1] + [Circuit2] + [Circuit3]. TotalWatt = (8 * 1 * 58W) = 464 [Watt]** **Circuit1 = [LECL004ALIMINLIH01 * TotalWatt_C1]/1000; TotalWatt_C1 = (1 x 1 x 58W) = 58 [Watt]** **Circuit2 = [LECL004ALIMINLIH02 * TotalWatt_C2]/1000; TotalWatt_C2 = (4 x 1 x 58W) = 232 [Watt]** **Circuit3 = [LECL004ALIMINLIH03 * TotalWatt_C3]/1000; TotalWatt_C3 = (3 x 1 x 58W) = 174 [Watt]**
11	LECL004THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[(LECL004RADMINVAM01 + LECL004RADMINVAM02) * NominalPower]/1000;** **NominalPower = 1383 [Watt]**
12	LECL004ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		**[LECL004ATIROOTEH01 > LECL004ATIROOTES01]** AND [**LECL004RADMINVAH01>0** OR **LECL004RADMINVAH02>0**]
13	LECL004WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[(LECL004WINWIOPEH01 > 0) AND (LECL004RADMINVAH01 > 0 OR LECL004RADMINVAH02 > 0)]**
14	LECL004OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		**[(LECL004OCCROWOWM01 <> 0) OR (LECL004OCCROWOWM02 <> 0)]** in the specific time interval
15	LECL004ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[LECL004ALIMINLIH01>0 OR LECL004ALIMINLIH02>0 OR LECL004ALIMINLIH03>0] AND [LECL003ATSPTEMH01=0]**
16	LECL004THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
17	LECL004THCLTHSOH01	Last time heating system OFF	timestamp			1		The last time the heating system is turned OFF during the whole day.
			TOTALS	**15**	**15**	**16**	**26**	
				72				

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

	Label	Class Room #5	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.32 - Data received by DOKI - Data Transmission = 5 minutes.
1	LECL005ALILIFLUC01	Lighting: Status Circuit 1	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	LECL005ALIMINLIM01	Lighting: Minutes ON Circuit 1	minutes		1		1	Cumulative in the hour
3	LECL005ALIHOULIM01	Lighting: Hours ON Circuit 1	hours		1		1	Cumulative from the installation
4	LECL005ALILIFLUC02	Lighting: Status Circuit 2	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
5	LECL005ALIMINLIM02	Lighting: Minutes ON Circuit 2	minutes		1		1	Cumulative in the hour
6	LECL005ALIHOULIM02	Lighting: Hours ON Circuit 2	hours		1		1	Cumulative from the installation
7	LECL005ALILIFLUC03	Lighting: Status Circuit 3	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
8	LECL005ALIMINLIM03	Lighting: Minutes ON Circuit 3	minutes		1		1	Cumulative in the hour
9	LECL005ALIHOULIM03	Lighting: Hours ON Circuit 3	hours		1		1	Cumulative from the installation
10	LECL005OCCPRESEM01	Presence Sensor 1	yes / no	1			1	0 = NO; 1 = YES. **It controls the lights in the classroom.**
11	LECL005OCCPRESEM02	Presence Sensor 2	yes / no	1			1	0 = NO; 1 = YES. **It controls the lights in the pre-room.**
12	LECL005ATIROOTEM01	Room Temperature	°C		1		1	
13	LECL005ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
14	LECL005RADMINVEC01	Radiator 1: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
15	LECL005RADMINVAM01	Radiator 1: Minutes ON	minutes		1		1	Cumulative in the hour
16	LECL005RADHOUVAM01	Radiator 1: Hours ON	hours		1		1	Cumulative from the installation
17	LECL005RADMINVEC02	Radiator 2: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
18	LECL005RADMINVAM02	Radiator 2: Minutes ON	minutes		1		1	Cumulative in the hour
19	LECL005RADHOUVAM02	Radiator 2: Hours ON	hours		1		1	Cumulative from the installation
20	LECL005RADPIDORC01	Radiators: Control signal	%		1		1	**PID < 33% R1 & R2 = OFF; 34% < PID < 66% R1 = ON & R2 = OFF; PID > 66% R1 & R2 ON**
21	LECL005WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
22	LECL005OCCROWOWM01	Room Control Status: 1	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.** It refers to the classroom.
23	LECL005OCCROWOWM02	Room Control Status: 2	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.** It refers to the pre-room.
24	LECL005RADTHRADS01	Threshold Radiator 1	%		1		1	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
25	LECL005RADTHRADS02	Threshold Radiator 2	%		1		1	Set-Point to switch ON/OFF Valve 2. **used by IES only to calibrate the building model**
26	LECL005ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				8	**18**	**0**	**26**	

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	LECL005ALIMINLIH01	Lighting: Minutes ON Circuit 1	minutes	1	1	1	3	ABS (last value - first value) of **LECL005ALIMINLIM01** in the specific time interval
2	LECL005ALIMINLIH02	Lighting: Minutes ON Circuit 2	minutes	1	1	1	3	ABS (last value - first value) of **LECL005ALIMINLIM02** in the specific time interval
3	LECL005ALIMINLIH03	Lighting: Minutes ON Circuit 3	minutes	1	1	1	3	ABS (last value - first value) of **LECL005ALIMINLIM03** in the specific time interval
4	LECL005ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **LECL005ATIROOTEM01** in the specific time interval
5	LECL005ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **LECL005ATIROOTES01** in the specific time interval.
6	LECL005OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	[Number of events that (**LECL005OCCPRESEM01>0 OR LECL005OCCPRESEM02>0**)] *** 5 [minutes]**
7	LECL005RADVALVEH02	Radiators: Minutes ON Valve 1	minutes	1	1	1	3	ABS (last value - first value) of **LECL005RADMINVAM01** in the specific time interval
8	LECL005RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	3	ABS (last value - first value) of **LECL005RADMINVAM02** in the specific time interval
9	LECL005WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **LECL005WINWIOPEM01 > 0**] * 5 [minutes], in the specific time interval

	Label	Class Room #5	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.32 - Data received by DOKI - Data Transmission = 5 minutes.
10	LECL005ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**[Circuit1] + [Circuit2] + [Circuit3]. TotalWatt = (9 * 1 * 58W) = 522 [Watt]** **Circuit1 = [LECL005ALIMINLIH01 * TotalWatt_C1]/1000; TotalWatt_C1 = (2*1*58W) = 116 [Watt]** **Circuit2 = [LECL005ALIMINLIH02 * TotalWatt_C2]/1000; TotalWatt_C2 = (4*1*58W) = 232 [Watt]** **Circuit3 = [LECL005ALIMINLIH03 * TotalWatt_C3]/1000; TotalWatt_C3 = (3*1*58W) = 174 [Watt]**
11	LECL005THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[(LECL005RADMINVAM01 + LECL005RADMINVAM02) * NominalPower]/1000;** **NominalPower = 1843 [Watt]**
12	LECL005ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		**[LECL005ATIROOTEH01 > LECL005ATIROOTES01]** AND [**LECL005RADMINVAH01>0** OR **LECL005RADMINVAH02>0**]
13	LECL005WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[(LECL005WINWIOPEH01 > 0) AND (LECL005RADMINVAH01 > 0 OR LECL005RADMINVAH02 > 0)]**
14	LECL005OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		**[(LECL005OCCROWOWM01 <> 0) OR (LECL005OCCROWOWM02 <> 0)]** in the specific time interval
15	LECL005ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[(LECL005ALIMINLIH01 > 0 OR LECL005ALIMINLIH02 > 0 OR LECL005ALIMINLIH03 > 0) AND (LECL005ATSPTEMH01 = 0)]**
16	LECL005THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
17	LECL005THCLTHSOH01	Last time heating system OFF	timestamp			1		The last time the heating system is turned OFF during the whole day.
			TOTALS	**15**	**15**	**16**	**26**	
				72				

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

	Label	Class Room #6 (LED & dimming)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.33 - Data received by DOKI - Data Transmission = 5 minutes.
1	LECL006ALIOLPIDD01	Lighting: Control signal	volt		1		**1**	**PID output 0÷10 [volt]. Status: ON if LECL006ALIOLPIDD01>0; OFF if LECL006ALIOLPIDD01=0.**
2	LECL006ALIBLRROM01	Room Brightness	lux		1		**1**	Brightness measurement.
3	LECL006ALISPBLRS01	Set Point Room Brightness	lux		1		**1**	Brightness Setpoint
4	LECL006OCCPRESEM01	Presence Sensor	yes / no	1			**1**	0 = NO; 1 = YES
5	LECL006ATIROOTEM01	Room Temperature	°C		1		**1**	
6	LECL006ATIROOTES01	Set-Point Room Temperature	°C		1		**1**	Current Set-Point of the Room Temperature
7	LECL006RADMINVEC01	Radiator 1: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON
8	LECL006RADMINVAM01	Radiator 1: Minutes ON	minutes		1		**1**	Cumulative in the hour
9	LECL006RADHOUVAM01	Radiator 1: Hours ON	hours		1		**1**	Cumulative from the installation
10	LECL006RADMINVEC02	Radiator 2: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON
11	LECL006RADMINVAM02	Radiator 2: Minutes ON	minutes		1		**1**	Cumulative in the hour
12	LECL006RADHOUVAM02	Radiator 2: Hours ON	hours		1		**1**	Cumulative from the installation
13	LECL006RADPIDORC01	Radiators: Control signal	%		1		**1**	**PID < 33% R1 & R2 = OFF; 34% < PID < 66% R1 = ON & R2 = OFF; PID > 66% R1 & R2 ON**
14	LECL006WINWIOPEM01	Windows: status	close/open	1			**1**	0 = Windows CLOSED; 1 = Windows OPENED
15	LECL006OCCROWOWM01	Room Control Status	-		1		**1**	**0 = automatic; 1 = manual; 2 = stand-by.**
16	LECL006RADTHRADS01	Threshold Radiator 1	°C		1		**1**	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
17	LECL006RADTHRADS02	Threshold Radiator 2	°C		1		**1**	Set-Point to switch ON/OFF Valve 2. **used by IES only to calibrate the building model**
18	LECL006ALITRELIS01	Threshold Light 1	%		1		**1**	Light Activation Threshold. **It is used by IES only for calibrating the building model.**
19	LECL006ALIWAITIT01	Waiting Time	minutes		1		**1**	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				4	**15**	**0**	**19**	

N	HQDS; High Quality Data Set			15'	hour	Day	QI	
1	LECL006ALILILEDH01	Lighting: Control signal	volt	1	1	1	**3**	Average among all value of **LECL006ALIOLPIDD01** in the specific time interval
2	LECL006ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	**3**	**[Number of Events that LECL006ALIOLPIDD01>0] * 5 [minutes]**, in the specific interval
3	LECL006ALIBLRROH01	Room Brightness	Lux	1	1	1	**3**	Average among all value of **LECL006ALIBLRROM01** in the specific time interval
4	LECL006ALISPBLRH01	Set Point Room Brightness	lux	1	1	1	**3**	Last value of **LECL006ALISPBLRS01** in the specific time interval
5	LECL006ATIROOTEH01	Room Temperature	°C	1	1	1	**3**	Average among all value of **LECL006ATIROOTEM01** in the specific time interval
6	LECL006ATISPTEMH01	Set-Point Room Temperature	°C	1	1		**2**	Last value of **LECL006ATIROOTES01** in the specific time interval
7	LECL006OCCPRESEH01	Presence Sensor	minutes	1	1	1	**3**	[Number of events that **LECL006OCCPRESEM01 > 0**] *** 5 [minutes]**, in the specific time interval
8	LECL006RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	**3**	ABS (last value - first value) of **LECL006RADMINVAM01** in the specific time interval
9	LECL006RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	**3**	ABS (last value - first value) of **LECL006RADMINVAM02** in the specific time interval
10	LECL006WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	**3**	[Number of events that **LECL006WINWIOPEM01 > 0**] * 5 [minutes], in the specific time interval
11	LECL006ALIERGCLH01	Lighting Energy Consumption	kWh	1	1	1		**[LECL006ALIMINLIH01 * (LECL006ALIOLPIDD01/10) * TotalW]/1000; TotalW = (7x30W)=210 [Watt]**
12	LECL006THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[(LECL006RADMINVAM01 + LECL006RADMINVAM02) * N.Power]/1000; N.Power = 1009 [Watt]**
13	LECL006ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		**[LECL006ATIROOTEH01 > LECL006OCCPRESEM01]** AND [**LECL006RADMINVAH0x>0**], x=1, 2
14	LECL006ATILHTSPH01	"Luxamb < Set-point & Light ON"	events	1	1	1		**[LECL006ALIBLRROH01 < LECL006ALISPBLRH01]** AND [**LECL006ALIOLPIDD01>0**] in the interval
15	LECL006WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[(LECL006WINWIOPEH01 > 0) AND (LECL006RADMINVAH01 > 0 OR LECL006RADMINVAH02 > 0)]**
16	LECL006OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		**[(LECL006OCCROWOWM01 <> 0)]** in the specific time interval
17	LECL006ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[LECL006ALILILEDH01 > 0 AND LECL006OCCPRESEM01=0]** in the interval
18	LECL006THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
19	LECL006THCLTHSOH01	Last time heating system OFF	timestamp			1		The last time the heating system is turned OFF during the whole day.
			TOTALS	**17**	**17**	**18**	**29**	
				81				

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

	Label	Class Room #7 (LED & dimming)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.34 - Data received by DOKI - Data Transmission = 5 minutes.
1	LECL007ALIOLPIDD01	Lighting: Control signal	volt		1		**1**	**PID output 0÷10 [volt]. Status: ON if LECL006ALIOLPIDD01>0; OFF if LECL006ALIOLPIDD01=0.**
2	LECL007ALIBLRROM01	Room Brightness	lux		1		**1**	Brightness measurement.
3	LECL007ALISPBLRS01	Set Point Room Brightness	lux		1		**1**	Brightness Setpoint
4	LECL007OCCPRESEM01	Presence Sensor	yes / no	1			**1**	0 = NO; 1 = YES
5	LECL007ATIROOTEM01	Room Temperature	°C		1		**1**	
6	LECL007ATIROOTES01	Set-Point Room Temperature	°C		1		**1**	Current Set-Point of the Room Temperature
7	LECL007RADMINVEC01	Radiator 1: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON
8	LECL007RADMINVAM01	Radiator 1: Minutes ON	minutes		1		**1**	Cumulative in the hour
9	LECL007RADHOUVAM01	Radiator 1: Hours ON	hours		1		**1**	Cumulative from the installation
10	LECL007RADMINVEC02	Radiator 2: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON
11	LECL007RADMINVAM02	Radiator 2: Minutes ON	minutes		1		**1**	Cumulative in the hour
12	LECL007RADHOUVAM02	Radiator 2: Hours ON	hours		1		**1**	Cumulative from the installation
13	LECL007RADPIDORC01	Radiators: Control signal	%		1		**1**	**PID < 33% R1 & R2 = OFF; 34% < PID < 66% R1 = ON & R2 = OFF; PID > 66% R1 & R2 ON**
14	LECL007WINWIOPEM01	Windows: status	close/open	1			**1**	0 = Windows CLOSED; 1 = Windows OPENED
15	LECL007OCCROWOWM01	Room Control Status	-		1		**1**	**0 = automatic; 1 = manual; 2 = stand-by.**
16	LECL007RADTHRADS01	Threshold Radiator 1	°C		1		**1**	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
17	LECL007RADTHRADS02	Threshold Radiator 2	°C		1		**1**	Set-Point to switch ON/OFF Valve 2. **used by IES only to calibrate the building model**
18	LECL007ALITRELIS01	Threshold Light 1	%		1		**1**	Light Activation Threshold. **It is used by IES only for calibrating the building model.**
19	LECL007ALIWAITIT01	Waiting Time	minutes		1		**1**	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				4	**15**	**0**	**19**	

N	HQDS; High Quality Data Set			15'	hour	Day	QI	
1	LECL007ALILILEDH01	Lighting: Control signal	volt	1	1	1	**3**	Average among all value of **LECL007ALIOLPIDD01** in the specific time interval
2	LECL007ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	**3**	**[Number of Events that LECL007ALIOLPIDD01>0] * 5 [minutes]**, in the specific interval
3	LECL007ALIBLRROH01	Room Brightness	Lux	1	1	1	**3**	Average among all value of **LECL007ALIBLRROM01** in the specific time interval
4	LECL007ALISPBLRH01	Set Point Room Brightness	lux	1	1	1	**3**	Last value of **LECL007ALISPBLRS01** in the specific time interval
5	LECL007ATIROOTEH01	Room Temperature	°C	1	1	1	**3**	Average among all value of **LECL007ATIROOTEM01** in the specific time interval
6	LECL007ATSPTEMH01	Set-Point Room Temperature	°C	1	1		**2**	Last value of **LECL007ATIROOTES01** in the specific time interval
7	LECL007OCCPRESEH01	Presence Sensor	minutes	1	1	1	**3**	[Number of events that **LECL007OCCPRESEM01 > 0**] *** 5 [minutes]**, in the specific time interval
8	LECL007RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	**3**	ABS (last value - first value) of **LECL007RADMINVAM01** in the specific time interval
9	LECL007RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	**3**	ABS (last value - first value) of **LECL007RADMINVAM02** in the specific time interval
10	LECL007WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	**3**	[Number of events that **LECL007WINWIOPEM01 > 0**] * 5 [minutes], in the specific time interval
11	LECL007ALIERGCLH01	Lighting Energy Consumption	kWh	1	1	1		**[LECL007ALIMINLIH01*(LECL007ALIOLPIDD01/10) *TotalW]/1000; TotalW = (7x30W) = 210 [Watt]**
12	LECL007THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[(LECL007RADMINVAM01 + LECL007RADMINVAM02) * N.Power]/1000; N.Power = 1214 [Watt]**
13	LECL007ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		**[LECL007ATIROOTEH01 > LECL007OCCPRESEM01]** AND **[LECL007RADMINVAH0x>0]**, x=1, 2
14	LECL007ATILHTSPH01	"Luxamb < Set-point & Light ON"	events	1	1	1		**[LECL007ALIBLRROH01 < LECL007ALISPBLRH01]** AND **[LECL007ALIOLPIDD01>0]** in the interval
15	LECL007WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[LECL007WINWIOPEH01>0 AND (LECL007RADMINVAH01>0 OR LECL007RADMINVAH02 > 0)]**
16	LECL007OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		**[(LECL007OCCROWOWM01 <> 0)]** in the specific time interval
17	LECL007ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[LECL007ALIMINLIH01>0 AND LECL007OCCPRESEM01=0]** in the interval
18	LECL007THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
19	LECL007THCLTHSOH01	Last time heating system OFF	timestamp			1		The last time the heating system is turned OFF during the whole day.
			TOTALS	**17**	**17**	**18**	**29**	
				81				

Figure 4-6: Classroom #7 - physical measurement and HQDS variables.

	Label	Class Room #8 (with LED)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.35 - Data received by DOKI - Data Transmission = 5 minutes.
1	LECL008ALILILEDC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type LED
2	LECL008ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour.
3	LECL008ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative for the installation.
4	LECL008OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	LECL008ATIROOTEM01	Room Temperature	°C		1		1	
6	LECL008ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
7	LECL008RADMINVEC01	Radiator 1: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
8	LECL008RADMINVAM01	Radiator 1: Minutes ON	minutes		1		1	Cumulative in the hour
9	LECL008RADHOUVAM01	Radiator 1: Hours ON	hours		1		1	Cumulative from the installation
10	LECL008RADMINVEC02	Radiator 2: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
11	LECL008RADMINVAM02	Radiator 2: Minutes ON	minutes		1		1	Cumulative in the hour
12	LECL008RADHOUVAM02	Radiator 2: Hours ON	hours		1		1	Cumulative from the installation
13	LECL008RADPIDORC01	Radiators: Control signal	%		1		1	**PID < 33% R1 & R2 = OFF; 34% < PID < 66% R1 = ON & R2 = OFF; PID > 66% R1 & R2 ON**
14	LECL008WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
15	LECL008OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
16	LECL008RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
17	LECL008RADTHRADS02	Threshold Radiator 2	°C		1		1	Set-Point to switch ON/OFF Valve 2. **used by IES only to calibrate the building model**
18	LECL008ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				5	**13**	**0**	**18**	

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	LECL008ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **LECL008ALIMINLIM01** in the specific time interval
2	LECL008ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **LECL008ATIROOTEM01** in the specific time interval
3	LECL008ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **LECL008ATIROOTES01** in the specific time interval
4	LECL008OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	[Number of events that **LECL008OCCPRESEM01 > 0**] *** 5 [minutes]**, in the specific time interval
5	LECL008RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	3	ABS (last value - first value) of **LECL008RADMINVAM01** in the specific time interval
6	LECL008RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	3	ABS (last value - first value) of **LECL008RADMINVAM02** in the specific time interval
7	LECL008WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **LECL008WINWIOPEM01 > 0**] * 5 [minutes], in the specific time interval
8	LECL008ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**[LECL008ALIMINLIH01 * (LECL008ALIOLPIDD01/10) *TotalW]/1000; TotalW = (7x30W) =210 [Watt]**
9	LECL008THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[(LECL008RADMINVAM01 + LECL008RADMINVAM02) * N.Power]/1000; N.Power = 939 [Watt]**
10	LECL008ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		**[LECL008ATIROOTEH01 > LECL008OCCPRESEM01]** AND **[LECL008RADMINVAH0x>0]**, x=1,2
11	LECL008WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[(LECL008WINWIOPEH01 > 0) AND (LECL008RADMINVAH01 > 0 OR LECL008RADMINVAH02 > 0)]**
12	LECL008OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		**[LECL008OCCROWOWM01 <> 0]** in the specific time interval
13	LECL008ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[LECL008ALIMINLIH01>0 AND LECL008OCCPRESEH01=0)]** in the specific time interval
14	LECL008THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
15	LECL008THCLTHSOH01	Last time heating system OFF	timestamp			1		The last time the heating system is turned OFF during the whole day.
			TOTALS	**13**	**13**	**14**	**20**	
				60				

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

	Label	Class Room #10 (LED & dimming)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.36 - Data received by DOKI - Data Transmission = 5 minutes.
1	LECL010ALIOLPIDD01	Lighting: Control signal	volt		1		**1**	**PID output 0÷10 [volt]. Status: ON if LECL006ALIOLPIDD01>0; OFF if LECL006ALIOLPIDD01=0.**
2	LECL010ALIBLRROM01	Room Brightness	lux		1		**1**	Brightness measurement.
3	LECL010ALISPBLRS01	Set Point Room Brightness	lux		1		**1**	Brightness Setpoint
4	LECL010OCCPRESEM01	Presence Sensor	yes / no	1			**1**	0 = NO; 1 = YES
5	LECL010ATIROOTEM01	Room Temperature	°C		1		**1**	
6	LECL006ATIROOTES01	Set-Point Room Temperature	°C		1		**1**	Current Set-Point of the Room Temperature
7	LECL010RADMINVEC01	Radiator 1: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON
8	LECL010RADMINVAM01	Radiator 1: Minutes ON	minutes		1		**1**	Cumulative in the hour
9	LECL010RADHOUVAM01	Radiator 1: Hours ON	hours		1		**1**	Cumulative from the installation
10	LECL010RADMINVEC02	Radiator 2: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON
11	LECL010RADMINVAM02	Radiator 2: Minutes ON	minutes		1		**1**	Cumulative in the hour
12	LECL010RADHOUVAM02	Radiator 2: Hours ON	hours		1		**1**	Cumulative from the installation
13	LECL010RADPIDORC01	Radiators: Control signal	%		1		**1**	**PID < 33% R1 & R2 = OFF; 34% < PID < 66% R1 = ON & R2 = OFF; PID > 66% R1 & R2 ON**
14	LECL010WINWIOPEM01	Windows: status	close/open	1			**1**	0 = Windows CLOSED; 1 = Windows OPENED
15	LECL010OCCROWOWM01	Room Control Status	-		1		**1**	**0 = automatic; 1 = manual; 2 = stand-by.**
16	LECL010RADTHRADS01	Threshold Radiator 1	°C		1		**1**	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
17	LECL010RADTHRADS02	Threshold Radiator 2	°C		1		**1**	Set-Point to switch ON/OFF Valve 2. **used by IES only to calibrate the building model**
18	LECL010ALITRELIS01	Threshold Light 1	%		1		**1**	Light Activation Threshold. **It is used by IES only for calibrating the building model.**
19	LECL010ALIWAITIT01	Waiting Time	minutes		1		**1**	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				4	**15**	**0**	**19**	

N	HQDS; High Quality Data Set			15'	hour	Day	QI	
1	LECL010ALILILEDH01	Lighting: Control signal	volt	1	1	1	**3**	Average among all value of **LECL010ALIOLPIDD01** in the specific time interval
2	LECL010ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	**3**	**[Number of Events that LECL010ALIOLPIDD01>0] * 5 [minutes]**, in the specific interval
3	LECL010ALIBLRROH01	Room Brightness	Lux	1	1	1	**3**	Average among all value of **LECL010ALIBLRROM01** in the specific time interval
4	LECL010ALISPBLRH01	Set Point Room Brightness	lux	1	1	1	**3**	Last value of **LECL010ALISPBLRS01** in the specific time interval
5	LECL010ATIROOTEH01	Room Temperature	°C	1	1	1	**3**	Average among all value of **LECL010ATIROOTEM01** in the specific time interval
6	LECL010ATSPTEMH01	Set-Point Room Temperature	°C	1	1		**2**	Last value of **LECL010ATIROOTES01** in the specific time interval
7	LECL010OCCPRESEH01	Presence Sensor	minutes	1	1	1	**3**	[Number of events that **LECL010OCCPRESEM01 > 0**] *** 5 [minutes]**, in the specific time interval
8	LECL010RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	**3**	ABS (last value - first value) of **LECL010RADMINVAM01** in the specific time interval
9	LECL010RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	**3**	ABS (last value - first value) of **LECL010RADMINVAM02** in the specific time interval
10	LECL010WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	**3**	[Number of events that **LECL010WINWIOPEM01 > 0**] * 5 [minutes], in the specific time interval
11	LECL010ALIERGCLH01	Lighting Energy Consumption	kWh	1	1	1		**[LECL010ALIMINLIH01*(LECL010ALIOLPIDD01/10)*TotalW]/1000; TotalW = (7x30W) = 210 [Watt]**
12	LECL010THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[(LECL010RADMINVAM01 + LECL010RADMINVAM02) * N.Power]/1000; N.Power = 1125 [Watt]**
13	LECL010ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		**[LECL010ATIROOTEH01 > LECL010OCCPRESEM01]** AND **[LECL010RADMINVAH0x>0]**, x= 1, 2
14	LECL010ATILHTSPH01	"Luxamb < Set-point & Light ON"	events	1	1	1		**[LECL010ALIBLRROH01 < LECL010ALISPBLRH01]** AND **[LECL010ALIOLPIDD01>0]** in the interval
15	LECL010WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[LECL010WINWIOPEH01>0 AND (LECL010RADMINVAH01>0 OR LECL010RADMINVAH02 > 0)]**
16	LECL010OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		**[(LECL010OCCROWOWM01 <> 0)]** in the specific time interval
17	LECL010ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[LECL010ALIMINLIH01>0 AND LECL010OCCPRESEM01=0]** in the interval
18	LECL010THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
19	LECL010THCLTHSOH01	Last time heating system OFF	timestamp			1		The last time the heating system is turned OFF during the whole day.
			TOTALS	**17**	**17**	**18**	**29**	
				81				

Figure 4-8: Classroom #10 - physical measurement and HQDS variables.

	Label	Class Room #11	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.37 - Data received by DOKI - Data Transmission = 5 minutes.
1	LECL011ALILIFLUC01	Lighting: Status Circuit 1	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	LECL011ALIMINLIM01	Lighting: Minutes ON Circuit 1	minutes		1		1	Cumulative in the hour
3	LECL011ALIHOULIM01	Lighting: Hours ON Circuit 1	hours		1		1	Cumulative from the installation
4	LECL011ALILIFLUC02	Lighting: Status Circuit 2	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
5	LECL011ALIMINLIM02	Lighting: Minutes ON Circuit 2	minutes		1		1	Cumulative in the hour
6	LECL011ALIHOULIM02	Lighting: Hours ON Circuit 2	hours		1		1	Cumulative from the installation
7	LECL011OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
8	LECL011ATIROOTEM01	Room Temperature	°C		1		1	
9	LECL011ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
10	LECL011RADMINVEC01	Radiator 1: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
11	LECL011RADMINVAM01	Radiator 1: Minutes ON	minutes		1		1	Cumulative in the hour
12	LECL011RADHOUVAM01	Radiator 1: Hours ON	hours		1		1	Cumulative from the installation
13	LECL011RADMINVEC02	Radiator 2: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
14	LECL011RADMINVAM02	Radiator 2: Minutes ON	minutes		1		1	Cumulative in the hour
15	LECL011RADHOUVAM02	Radiator 2: Hours ON	hours		1		1	Cumulative from the installation
16	LECL011RADPIDORC01	Radiators: Control signal	%		1		1	**PID < 33% R1 & R2 = OFF; 34% < PID < 66% R1 = ON & R2 = OFF; PID > 66% R1 & R2 ON**
17	LECL011WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
18	LECL011OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
19	LECL011RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
20	LECL011RADTHRADS02	Threshold Radiator 2	°C		1		1	Set-Point to switch ON/OFF Valve 2. **used by IES only to calibrate the building model**
21	LECL011ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				6	**15**	**0**	**21**	

N	HQDS; High Quality Data Set			15'	hour	Day	QI	
1	LECL011ALIMINLIH01	Lighting: Minutes ON Circuit 1	minutes	1	1	1	3	ABS (last value - first value) of **LECL011ALIMINLIM01** in the specific time interval
2	LECL011ALIMINLIH02	Lighting: Minutes ON Circuit 2	minutes	1	1	1	3	ABS (last value - first value) of **LECL011ALIMINLIM02** in the specific time interval
3	LECL011ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **LECL011ATIROOTEM01** in the specific time interval
4	LECL011ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **LECL011ATIROOTES01** in the specific time interval
5	LECL011OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	[Number of events that **LECL011OCCPRESEM01 > 0**] *** 5 [minutes]**, in the specific time interval
6	LECL011RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	3	ABS (last value - first value) of **LECL011RADMINVAM01** in the specific time interval
7	LECL011RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	3	ABS (last value - first value) of **LECL011RADMINVAM02** in the specific time interval
8	LECL011WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **LECL011WINWIOPEM01 > 0**] * 5 [minutes], in the specific time interval
9	LECL011ALIERGCLH01	Lighting Energy Consumption	kWh	1	1	1		**Circuit1 = [LECL011ALIMINLIH01 * TotalWatt_C1]/1000; Totalwatt_C1 = (4 x 1 x 58W) = 232 [Watt]** **Circuit2 = [LECL011ALIMINLIH02 * TotalWatt_C2]/1000; Totalwatt_C2 = (3 x 1 x 58W) = 174 [Watt]**
10	LECL011THCENRGYH01	Lighting Energy Consumption	kWh	1	1	1		**[(LECL011RADMINVAM01 + LECL011RADMINVAM02) * N.Power]/1000; N.Power = 831 [Watt]**
11	LECL011ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		**[LECL011ATIROOTEH01 > LECL011ATIROOTES01]** AND **[LECL011RADMINVAH0x>0]**, x= 1, 2
12	LECL011WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[(LECL011WINWIOPEH01 > 0) AND (LECL011RADMINVAH01 > 0 OR LECL011RADMINVAH02 > 0)]**
13	LECL011OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		**[LECL011OCCROWOWM01 <> 0]** in the specific time interval
14	LECL011ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[(LECL011ALIMINLIH01 > 0 OR LECL011ALIMINLIH02 > 0) AND (LECL011ATSPTEMH01 = 0)]**
15	LECL011THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
16	LECL011THCLTHSOH01	Last time heating system OFF	timestamp			1		The last time the heating system is turned OFF during the whole day.
			TOTALS	**14**	**14**	**15**	**23**	
				66				

Figure 4-9: Classroom #11 - physical measurement and HQDS variables.

	Label	Class Room #12	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.38 - Data received by DOKI - Data Transmission = 5 minutes.
1	LECL012ALILIFLUC01	Lighting: Status Circuit 1	ON/OFF	1			**1**	0 = OFF; 1 = ON. type fluorescent
2	LECL012ALIMINLIM01	Lighting: Minutes ON Circuit 1	minutes		1		**1**	Cumulative in the hour
3	LECL012ALIHOULIM01	Lighting: Hours ON Circuit 1	hours		1		**1**	Cumulative from the installation
4	LECL012ALILIFLUC02	Lighting: Status Circuit 2	ON/OFF	1			**1**	0 = OFF; 1 = ON. type fluorescent
5	LECL012ALIMINLIM02	Lighting: Minutes ON Circuit 2	minutes		1		**1**	Cumulative in the hour
6	LECL012ALIHOULIM02	Lighting: Hours ON Circuit 2	hours		1		**1**	Cumulative from the installation
7	LECL012OCCPRESEM01	Presence Sensor	yes / no	1			**1**	0 = NO; 1 = YES
8	LECL012ATIROOTEM01	Room Temperature	°C		1		**1**	
9	LECL012ATIROOTES01	Set-Point Room Temperature	°C		1		**1**	Current Set-Point of the Room Temperature
10	LECL012RADMINVEC01	Radiator 1: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON
11	LECL012RADMINVAM01	Radiator 1: Minutes ON	minutes		1		**1**	Cumulative in the hour
12	LECL012RADMINVEC02	Radiator 1: Hours ON	hours		1		**1**	Cumulative from the installation
13	LECL012RADHOUVAM01	Radiator 2: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON
14	LECL012RADMINVAM02	Radiator 2: Minutes ON	minutes		1		**1**	Cumulative in the hour
15	LECL012RADHOUVAM02	Radiator 2: Hours ON	hours		1		**1**	Cumulative from the installation
16	LECL012RADPIDORC01	Radiators: Control signal	%		1		**1**	**PID < 33% R1 & R2 = OFF; 34% < PID < 66% R1 = ON & R2 = OFF; PID > 66% R1 & R2 ON**
17	LECL012WINWIOPEM01	Windows: status	close/open	1			**1**	0 = Windows CLOSED; 1 = Windows OPENED
18	LECL012OCCROWOWM01	Room Control Status	-		1		**1**	**0 = automatic; 1 = manual; 2 = stand-by.**
19	LECL012RADTHRADS01	Threshold Radiator 1	°C		1		**1**	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
20	LECL012RADTHRADS02	Threshold Radiator 2	°C		1		**1**	Set-Point to switch ON/OFF Valve 2. **used by IES only to calibrate the building model**
21	LECL012ALIWAITIT01	Waiting Time	minutes		1		**1**	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				6	**15**	**0**	**21**	

N	HQDS; High Quality Data Set			15'	hour	Day	QI	
1	LECL012ALIMINLIH01	Lighting: Minutes ON Circuit 1	minutes	1	1	1	**3**	ABS (last value - first value) of **LECL012ALIMINLIM01** in the specific time interval
2	LECL012ALIMINLIH02	Lighting: Minutes ON Circuit 2	minutes	1	1	1	**3**	ABS (last value - first value) of **LECL012ALIMINLIM02** in the specific time interval
3	LECL012ATIROOTEH01	Room Temperature	°C	1	1	1	**3**	Average among all value of **LECL012ATIROOTEM01** in the specific time interval
4	LECL012ATSPTEMH01	Set-Point Room Temperature	°C	1	1		**2**	Last value of **LECL012ATIROOTES01** in the specific time interval
5	LECL012OCCPRESEH01	Presence Sensor	minutes	1	1	1	**3**	[Number of events that **LECL012OCCPRESEM01 > 0**] *** 5 [minutes]**, in the specific time interval
6	LECL012RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	**3**	ABS (last value - first value) of **LECL012RADMINVAM01** in the specific time interval
7	LECL012RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	**3**	ABS (last value - first value) of **LECL012RADMINVAM02** in the specific time interval
8	LECL012WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	**3**	[Number of events that **LECL012WINWIOPEM01 > 0**] * 5 [minutes], in the specific time interval
9	LECL012ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**Circuit1 = [LECL012ALIMINLIH01 * TotalWatt_C1]/1000; Totalwatt_C1 = (4 x 1 x 58W) = 232 [Watt]** **Circuit2 = [LECL012ALIMINLIH02 * TotalWatt_C2]/1000; Totalwatt_C2 = (3 x 1 x 58W) = 174 [Watt]**
10	LECL012THCENRGYH01	Lighting Energy Consumption	kWh	1	1	1		**[(LECL012RADMINVAM01 + LECL012RADMINVAM02) * N.Power]/1000; N.Power = 1228 [Watt]**
11	LECL012ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		**[LECL012ATIROOTEH01 > LECL012ATIROOTES01]** AND **[LECL012RADMINVAH01>0]**, x = 1, 2
12	LECL012WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[(LECL012WINWIOPEH01 > 0) AND (LECL012RADMINVAH01 > 0 OR LECL012RADMINVAH02 > 0)]**
13	LECL012OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		**[LECL012OCCROWOWM01 <> 0]** in the specific time interval
14	LECL012ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[(LECL012ALIMINLIH01 > 0 OR LECL012ALIMINLIH02 > 0) AND (LECL012ATSPTEMH01 = 0)]**
15	LECL012THCFTHSOH01	First Time heating system ON	timestamp	1	1	1		The first time the heating system is turned ON during the whole day.
16	LECL012THCLTHSOH01	Last time heating system OFF	timestamp			1		The last time the heating system is turned OFF during the whole day.
			TOTALS	**15**	**15**	**15**	**23**	
				68				

Figure 4-10: Classroom #12 - physical measurement and HQDS variables.

	Label	WC #2	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.39 - Data received by DOKI - Data Transmission = 5 minutes.
1	LEWC002ALILIFLUC01	Lighting: Status Circuit 1	ON/OFF	1			**1**	0 = OFF; 1 = ON. type fluorescent
2	LEWC002ALIMINLIM01	Lighting: Minutes ON Circuit 1	minutes		1		**1**	Cumulative in the hour
3	LEWC002ALIHOULIM01	Lighting: Hours ON Circuit 1	hours		1		**1**	Cumulative from the installation
4	LEWC002ALILIFLUC02	Lighting: Status Circuit 2	ON/OFF	1			**1**	0 = OFF; 1 = ON. type fluorescent
5	LEWC002ALIMINLIM02	Lighting: Minutes ON Circuit 2	minutes		1		**1**	Cumulative in the hour
6	LEWC002ALIHOULIM02	Lighting: Hours ON Circuit 2	hours		1		**1**	Cumulative from the installation
7	LEWC002ALILIFLUC03	Lighting: Status Circuit 3	ON/OFF	1			**1**	0 = OFF; 1 = ON. type fluorescent
8	LEWC002ALIMINLIM03	Lighting: Minutes ON Circuit 3	minutes		1		**1**	Cumulative in the hour
9	LEWC002ALIHOULIM03	Lighting: Hours ON Circuit 3	hours		1		**1**	Cumulative from the installation
10	LEWC002ALILIFLUC04	Lighting: Status Circuit 4	ON/OFF	1			**1**	0 = OFF; 1 = ON. type fluorescent
11	LEWC002ALIMINLIM04	Lighting: Minutes ON Circuit 4	minutes		1		**1**	Cumulative in the hour
12	LEWC002ALIHOULIM04	Lighting: Hours ON Circuit 4	hours		1		**1**	Cumulative from the installation
13	LEWC002OCCPRESEM01	Presence Sensor	yes / no	1			**1**	0 = NO; 1 = YES
14	LEWC002ATIROOTEM01	Room Temperature	°C		1		**1**	
15	LEWC002ATIROOTES01	Set-Point Room Temperature	°C		1		**1**	Current Set-Point of the Room Temperature
16	LEWC002RADMINVEC01	Radiator 1: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON
17	LEWC002RADMINVAM01	Radiator 1: Minutes ON	minutes		1		**1**	Cumulative in the hour
18	LEWC002RADHOUVAM01	Radiator 1: Hours ON	hours		1		**1**	Cumulative from the installation
19	LEWC002RADMINVEC02	Radiator 2: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON
20	LEWC002RADMINVAM02	Radiator 2: Minutes ON	minutes		1		**1**	Cumulative in the hour
21	LEWC002RADHOUVAM02	Radiator 2: Hours ON	hours		1		**1**	Cumulative from the installation
22	LEWC002RADPIDORC01	Radiators: Control signal	%		1		**1**	**PID < 33% R1 & R2 = OFF; 34% < PID < 66% R1 = ON & R2 = OFF; PID > 66% R1 & R2 ON**
23	LEWC002WINWIOPEM01	Windows Open	yes / no	1			**1**	Status OPEN/CLOSE of the windows
24	LEWC002OCCROWOWM01	Room Control Status	-		1		**1**	**0 = automatic; 1 = manual; 2 = stand-by.**
25	LEWC002RADTHRADS01	Threshold Radiator 1	°C		1		**1**	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
26	LEWC002RADTHRADS02	Threshold Radiator 2	°C		1		**1**	Set-Point to switch ON/OFF Valve 2. **used by IES only to calibrate the building model**
27	LEWC002ALIWAITIT01	Waiting Time	minutes		1		**1**	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				8	**19**	**0**	**27**	

N	HQDS; High Quality Data Set			15'	hour	Day	QI	
1	LEWC002ALIMINLIH01	Lighting: Minutes ON Circuit 1	minutes	1	1	1	**3**	ABS (last value - first value) of **LEWC002ALIMINLIM01** in the specific time interval
2	LEWC002ALIMINLIH02	Lighting: Minutes ON Circuit 2	minutes	1	1	1	**3**	ABS (last value - first value) of **LEWC002ALIMINLIM02** in the specific time interval
3	LEWC002ALIMINLIH03	Lighting: Minutes ON Circuit 3	minutes	1	1	1	**3**	ABS (last value - first value) of **LEWC002ALIMINLIM03** in the specific time interval
4	LEWC002ALIMINLIH04	Lighting: Minutes ON Circuit 4	minutes	1	1	1	**3**	ABS (last value - first value) of **LEWC002ALIMINLIM04** in the specific time interval
5	LEWC002ATIROOTEH01	Room Temperature	°C	1	1	1	**3**	Average among all value of **LEWC002ATIROOTEM01** in the specific time interval
6	LEWC002ATSPTEMH01	Set-Point Room Temperature	°C	1	1		**2**	Last value of **LEWC002ATIROOTES01** in the specific time interval
7	LEWC002OCCPRESEH01	Presence Sensor	minutes	1	1	1	**3**	[Number of events that **LEWC002OCCPRESEM01 > 0**] *** 5 [minutes]**, in the specific time interval
8	LEWC002RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	**3**	ABS (last value - first value) of **LEWC002RADMINVAM01** in the specific time interval
9	LEWC002RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	**3**	ABS (last value - first value) of **LEWC002RADMINVAM02** in the specific time interval
10	LEWC002WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	**3**	[Number of events that **LEWC002WINWIOPEM01 > 0**] * 5 [minutes], in the specific time interval

	Label	WC #2	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.39 - Data received by DOKI - Data Transmission = 5 minutes.
11	LEWC002ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**[Circuit1]+[Circuit2]+[Circuit3]+[Circuit4]. = (1*58W)+(1*60W)+(1*60W)+(1*60W) = 238 [Watt]** **Circuit1 = [LEWC002ALIMINLIH01 * TotalWatt_C1]/1000; Totalwatt_C1 = (1 x 58W) = 58 [Watt]** **Circuit2 = [LEWC002ALIMINLIH02 * TotalWatt_C2]/1000; Totalwatt_C2 = (1 x 60W) = 60 [Watt]** **Circuit3 = [LEWC002ALIMINLIH03 * TotalWatt_C3]/1000; Totalwatt_C3 = (1 x 60W) = 60 [Watt]** **Circuit4 = [LEWC002ALIMINLIH04 * TotalWatt_C4]/1000; Totalwatt_C4 = (1 x 60W) = 60 [Watt]**
12	LEWC002THCENRGYH01	Lighting Energy Consumption	kWh	1	1	1		**[(LEWC002RADMINVAM01 + LEWC002RADMINVAM02) * NominalPower]/1000; NominalPower = 414 [Watt]**
13	LEWC002ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		**[LEWC002ATIROOTEH01>LEWC002ATIROOTES01]** AND [**LEWC002RADMINVAH01>0** OR **LEWC002RADMINVAH02>0**]
14	LEWC002WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[(LEWC002WINWIOPEH01>0) AND (LEWC002RADMINVAH01>0 OR LEWC002RADMINVAH02>0)]**
15	LEWC002OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**LEWC002OCCROWOWH01 <> 0**] in the specific time interval
16	LEWC002ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[(LEWC002ALIMINLIH01>0 OR LEWC002ALIMINLIH02>0 OR LEWC002ALIMINLIH03>0 OR LEWC002ALIMINLIH04>0) AND LEWC002OCCPRESEH01=0]** in the interval
17	LEWC002THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
18	LEWC002THCLTHSOH01	Last time heating system OFF	timestamp			1		The last time the heating system is turned OFF during the whole day.
			TOTALS	**16**	**16**	**17**	**29**	
				78				

Figure 4-11: WC #02 - physical measurement and HQDS variables.

	Label	WC #9	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.40 - Data received by DOKI - Data Transmission = 5 minutes.
1	LEWC009ALILIFLUC01	Lighting: Status Circuit 1	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	LEWC009ALIMINLIM01	Lighting: Minutes ON Circuit 1	minutes		1		1	Cumulative in the hour
3	LEWC009ALIHOULIM01	Lighting: Hours ON Circuit 1	hours		1		1	Cumulative from the installation
4	LEWC009ALILIFLUC02	Lighting: Status Circuit 2	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
5	LEWC009ALIMINLIM02	Lighting: Minutes ON Circuit 2	minutes		1		1	Cumulative in the hour
6	LEWC009ALIHOULIM02	Lighting: Hours ON Circuit 2	hours		1		1	Cumulative from the installation
7	LEWC009ALILIFLUC03	Lighting: Status Circuit 3	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
8	LEWC009ALIMINLIM03	Lighting: Minutes ON Circuit 3	minutes		1		1	Cumulative in the hour
9	LEWC009ALIHOULIM03	Lighting: Hours ON Circuit 3	hours		1		1	Cumulative from the installation
10	LEWC009OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
11	LEWC009ATIROOTEM01	Room Temperature	°C		1		1	
12	LEWC009ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
13	LEWC009RADMINVEC01	Radiator: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
14	LEWC009RADMINVAM01	Radiator: Minutes ON	minutes		1		1	Cumulative in the hour
15	LEWC009RADHOUVAM01	Radiator: Hours ON	hours		1		1	Cumulative from the installation
16	LEWC009RADPIDORC01	Radiator: Control signal	%		1		1	**Control signal: < 50% R1 = OFF; > 50% R1 = ON**
17	LEWC009WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
18	LEWC009OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
19	LEWC009RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve. **used by IES only to calibrate the building model**
20	LEWC009ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				6	**14**	**0**	**20**	

N	HQDS; High Quality Data Set			15'	hour	Day	QI	
1	LEWC009ALIMINLIH01	Lighting: Minutes ON Circuit 1	minutes	1	1	1	3	ABS (last value - first value) of **LEWC009ALIMINLIM01** in the specific time interval
2	LEWC009ALIMINLIH02	Lighting: Minutes ON Circuit 2	minutes	1	1	1	3	ABS (last value - first value) of **LEWC009ALIMINLIM02** in the specific time interval
3	LEWC009ALIMINLIH03	Lighting: Minutes ON Circuit 3	minutes	1	1	1	3	ABS (last value - first value) of **LEWC009ALIMINLIM03** in the specific time interval
4	LEWC009ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **LEWC009ATIROOTEM01** in the specific time interval
5	LEWC009ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **LEWC009ATIROOTES01** in the specific time interval
6	LEWC009OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	[Number of events that **LEWC009OCCPRESEM01 > 0**] *** 5 [minutes]**, in the specific time interval
7	LEWC009RADMINVAH01	Radiators: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **LEWC009RADMINVAM01** in the specific time interval
8	LEWC009WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **LEWC009WINWIOPEM01 > 0**] * 5 [minutes], in the specific time interval
9	LEWC009ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**Circuit1 = [LEWC002ALIMINLIH01 * TotalWatt_C1]/1000; Totalwatt_C1 = (1 x 58W) = 58 [Watt]** **Circuit2 = [LEWC002ALIMINLIH02 * TotalWatt_C2]/1000; Totalwatt_C2 = (1 x 60W) = 60 [Watt]** **Circuit3 = [LEWC002ALIMINLIH03 * TotalWatt_C3]/1000; Totalwatt_C3 = (1 x 60W) = 60 [Watt]**
10	LEWC009THCENRGYH01	Lighting Energy Consumption	kWh	1	1	1		**[(LEWC002RADMINVAM01 + LEWC002RADMINVAM02) * N.Power]/1000; N.Power = 406 [Watt]**
11	LEWC009ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		**[LEWC009ATIROOTEH01 > LEWC009ATIROOTES01]** AND [**LEWC009RADMINVAH01>0**]
12	LEWC009WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[LEWC009WINWIOPEH01>0 AND LEWC009RADMINVAH01>0]** in the specific time interval
13	LEWC009OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**LEWC009OCCROWOWH01 <> 0**] in the specific time interval
14	LEWC009ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[LEWC002OCCPRESEH01=0] AND [(LEWC002ALIMINLIH0x>0]** (**OR**, with x= 1, 2, 3)
15	LEWC009THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
16	LEWC009THCLTHSOH01	Last time heating system OFF	timestamp			1		The last time the heating system is turned OFF during the whole day.
			TOTALS	**14**	**14**	**15**	**23**	
				66				

Figure 4-12: WC #09 - physical measurement and HQDS variables.

	Label	WC #13	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.41 - Data received by DOKI - Data Transmission = 5 minutes.
1	LEWC013ALILIFLUC01	Lighting: Status Circuit 1	ON/OFF	1			**1**	0 = OFF; 1 = ON. type fluorescent
2	LEWC013ALIMINLIM01	Lighting: Minutes ON Circuit 1	minutes		1		**1**	Cumulative in the hour
3	LEWC013ALIHOULIM01	Lighting: Hours ON Circuit 1	hours		1		**1**	Cumulative from the installation
4	LEWC013ALILIFLUC02	Lighting: Status Circuit 2	ON/OFF	1			**1**	0 = OFF; 1 = ON. type fluorescent
5	LEWC013ALIMINLIM02	Lighting: Minutes ON Circuit 2	minutes		1		**1**	Cumulative in the hour
6	LEWC013ALIHOULIM02	Lighting: Hours ON Circuit 2	hours		1		**1**	Cumulative from the installation
7	LEWC013ALILIFLUC03	Lighting: Status Circuit 3	ON/OFF	1			**1**	0 = OFF; 1 = ON. type fluorescent
8	LEWC013ALIMINLIM03	Lighting: Minutes ON Circuit 3	minutes		1		**1**	Cumulative in the hour
9	LEWC013ALIHOULIM03	Lighting: Hours ON Circuit 3	hours		1		**1**	Cumulative from the installation
10	LEWC013ALILIFLUC04	Lighting: Status Circuit 4	ON/OFF	1			**1**	0 = OFF; 1 = ON. type fluorescent
11	LEWC013ALIMINLIM04	Lighting: Minutes ON Circuit 4	minutes		1		**1**	Cumulative in the hour
12	LEWC013ALIHOULIM04	Lighting: Hours ON Circuit 4	hours		1		**1**	Cumulative from the installation
13	LEWC013OCCPRESEM01	Presence Sensor	yes / no	1			**1**	0 = NO; 1 = YES
14	LEWC013ATIROOTEM01	Room Temperature	°C		1		**1**	
15	LEWC013ATIROOTES01	Set-Point Room Temperature	°C		1		**1**	Current Set-Point of the Room Temperature
16	LEWC013RADMINVEC01	Radiator 1: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON
17	LEWC013RADMINVAM01	Radiator 1: Minutes ON	minutes		1		**1**	Cumulative in the hour
18	LEWC013RADHOUVAM01	Radiator 1: Hours ON	hours		1		**1**	Cumulative from the installation
19	LEWC013RADMINVEC02	Radiator 2: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON
20	LEWC013RADMINVAM02	Radiator 2: Minutes ON	minutes		1		**1**	Cumulative in the hour
21	LEWC013RADHOUVAM02	Radiator 2: Hours ON	hours		1		**1**	Cumulative from the installation
22	LEWC013RADPIDORC01	Radiators: Control signal	%		1		**1**	**PID < 33% R1 & R2 = OFF; 34% < PID < 66% R1 = ON & R2 = OFF; PID > 66% R1 & R2 ON**
23	LEWC013WINWIOPEM01	Windows Open	yes / no	1			**1**	Status OPEN/CLOSE of the windows
24	LEWC013OCCROWOWM01	Room Control Status	-		1		**1**	**0 = automatic; 1 = manual; 2 = stand-by.**
25	LEWC013RADTHRADS01	Threshold Radiator 1	°C		1		**1**	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
26	LEWC013RADTHRADS02	Threshold Radiator 2	°C		1		**1**	Set-Point to switch ON/OFF Valve 2. **used by IES only to calibrate the building model**
27	LEWC013ALIWAITIT01	Waiting Time	minutes		1		**1**	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				8	**19**	**0**	**27**	

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	LEWC013ALIMINLIH01	Lighting: Minutes ON Circuit 1	minutes	1	1	1	**3**	ABS (last value - first value) of **LEWC013ALIMINLIM01** in the specific time interval
2	LEWC013ALIMINLIH02	Lighting: Minutes ON Circuit 2	minutes	1	1	1	**3**	ABS (last value - first value) of **LEWC013ALIMINLIM02** in the specific time interval
3	LEWC013ALIMINLIH03	Lighting: Minutes ON Circuit 3	minutes	1	1	1	**3**	ABS (last value - first value) of **LEWC013ALIMINLIM03** in the specific time interval
4	LEWC013ALIMINLIH04	Lighting: Minutes ON Circuit 4	minutes	1	1	1	**3**	ABS (last value - first value) of **LEWC013ALIMINLIM04** in the specific time interval
5	LEWC013ATIROOTEH01	Room Temperature	°C	1	1	1	**3**	Average among all value of **LEWC013ATIROOTEM01** in the specific time interval
6	LEWC013ATSPTEMH01	Set-Point Room Temperature	°C	1	1		**2**	Last value of **LEWC013ATIROOTES01** in the specific time interval
7	LEWC013OCCPRESEH01	Presence Sensor	minutes	1	1	1	**3**	[Number of events that **LEWC013OCCPRESEM01 > 0**] *** 5 [minutes]**, in the specific time interval
8	LEWC013RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	**3**	ABS (last value - first value) of **LEWC013RADMINVAM01** in the specific time interval
9	LEWC013RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	**3**	ABS (last value - first value) of **LEWC013RADMINVAM02** in the specific time interval
10	LEWC013WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	**3**	[Number of events that **LEWC013WINWIOPEM01 > 0**] * 5 [minutes], in the specific time interval

	Label	WC #13	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.41 - Data received by DOKI - Data Transmission = 5 minutes.
11	LEWC013ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**[Circuit1]+[Circuit2]+[Circuit3]+[Circuit4]. = (1*58W)+(1*60W)+(1*60W)+(1*60W) = 238 [Watt]** **Circuit1 = [LEWC013ALIMINLIH01 * TotalWatt_C1]/1000; Totalwatt_C1 = (1 x 58W) = 58 [Watt]** **Circuit2 = [LEWC013ALIMINLIH02 * TotalWatt_C2]/1000; Totalwatt_C2 = (1 x 60W) = 60 [Watt]** **Circuit3 = [LEWC013ALIMINLIH03 * TotalWatt_C3]/1000; Totalwatt_C3 = (1 x 60W) = 60 [Watt]** **Circuit4 = [LEWC013ALIMINLIH04 * TotalWatt_C4]/1000; Totalwatt_C4 = (1 x 60W) = 60 [Watt]**
12	LEWC013THCENRGYH01	Lighting Energy Consumption	kWh	1	1	1		**[(LEWC013RADMINVAM01 + LEWC013RADMINVAM02) * N.Power]/1000; N.Power = 697 [Watt]**
13	LEWC013ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		**[LEWC013ATIROOTEH01>LEWC013ATIROOTES01]** AND [**LEWC013RADMINVAH01>0** OR **LEWC013RADMINVAH02>0**]
14	LEWC013WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[LEWC013WINWIOPEH01>0 AND (LEWC013RADMINVAH01>0 OR LEWC013RADMINVAH02>0]**
15	LEWC013OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**LEWC013OCCROWOWH01 <> 0**] in the specific time interval
16	LEWC013ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[(LEWC013ALIMINLIH01>0 OR LEWC013ALIMINLIH02>0 OR LEWC013ALIMINLIH03>0 OR LEWC013ALIMINLIH04>0) AND LEWC013OCCPRESEH01=0]** in the interval
17	LEWC013THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
18	LEWC013THCLTHSOH01	Last time heating system OFF	timestamp			1		The last time the heating system is turned OFF during the whole day.
			TOTALS	**16**	**16**	**17**	**29**	
				78				

Figure 4-13: WC #13 - physical measurement and HQDS variables.

	Label	Entrance, Lobby, Corridors	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.42 - Data received by DOKI - Data Transmission = 5 minutes.
1	LEHA001ALILIFLUC01	Lighting: Status Circuit 1	ON/OFF	1			**1**	0 = OFF; 1 = ON. type fluorescent
2	LEHA001ALIMINLIM01	Lighting: Minutes ON Circuit 1	minutes		1		**1**	Cumulative in the hour
3	LEHA001ALIHOULIM01	Lighting: Hours ON Circuit 1	hours		1		**1**	Cumulative from the installation
4	LEHA001ALILIFLUC02	Lighting: Status Circuit 2	ON/OFF	1			**1**	0 = OFF; 1 = ON. type fluorescent
5	LEHA001ALIMINLIM02	Lighting: Minutes ON Circuit 2	minutes		1		**1**	Cumulative in the hour
6	LEHA001ALIHOULIM02	Lighting: Hours ON Circuit 2	hours		1		**1**	Cumulative from the installation
7	LEHA001ALILIFLUC03	Lighting: Status Circuit 3	ON/OFF	1			**1**	0 = OFF; 1 = ON. type fluorescent
8	LEHA001ALIMINLIM03	Lighting: Minutes ON Circuit 3	minutes		1		**1**	Cumulative in the hour
9	LEHA001ALIHOULIM03	Lighting: Hours ON Circuit 3	hours		1		**1**	Cumulative from the installation
10	LEHA001ALILIFLUC04	Lighting: Status Circuit 4	ON/OFF	1			**1**	0 = OFF; 1 = ON. type fluorescent
11	LEHA001ALIMINLIM04	Lighting: Minutes ON Circuit 4	minutes		1		**1**	Cumulative in the hour
12	LEHA001ALIHOULIM04	Lighting: Hours ON Circuit 4	hours		1		**1**	Cumulative from the installation
13	LEHA001OCCPRESEM01	Presence Sensor 1	yes / no	1			**1**	0 = NO; 1 = YES
14	LEHA001OCCPRESEM02	Presence Sensor 1	yes / no	1			**1**	0 = NO; 1 = YES
15	LEHA001ATIROOTEM01	Room Temperature	°C		1		**1**	
16	LEHA001ATIROOTES01	Set-Point Room Temperature	°C		1		**1**	Current Set-Point of the Room Temperature
17	LEHA001RADMINVEC01	Radiator 1: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON
18	LEHA001RADMINVAM01	Radiator 1: Minutes ON	minutes		1		**1**	Cumulative in the hour
19	LEHA001RADHOUVAM01	Radiator 1: Hours ON	hours		1		**1**	Cumulative from the installation
20	LEHA001RADMINVEC02	Radiator 2: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON
21	LEHA001RADMINVAM02	Radiator 2: Minutes ON	minutes		1		**1**	Cumulative in the hour
22	LEHA001RADHOUVAM02	Radiator 2: Hours ON	hours		1		**1**	Cumulative from the installation
23	LEHA001RADPIDORC01	Radiators: Control signal	%		1		**1**	**PID < 33% R1 & R2 = OFF; 34% < PID < 66% R1 = ON & R2 = OFF; PID > 66% R1 & R2 ON**
24	LEHA001WINWIOPEM01	Windows Open	yes / no	1			**1**	Status OPEN/CLOSE of the windows
25	LEHA001OCCROWOWM01	Zone Control Status: 1	-		1		**1**	**0 = automatic; 1 = manual; 2 = stand-by. It refers to zone 1.**
26	LEHA001OCCROWOWM02	Zone Control Status: 2	-		1		**1**	**0 = automatic; 1 = manual; 2 = stand-by. It refers to zone 2.**
27	LEHA001RADTHRADS01	Threshold Radiator 1	°C		1		**1**	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
28	LEHA001RADTHRADS02	Threshold Radiator 2	°C		1		**1**	Set-Point to switch ON/OFF Valve 2. **used by IES only to calibrate the building model**
29	LEHA001ALIWAITIT01	Waiting Time	minutes		1		**1**	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				9	**20**	**0**	**29**	

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	LEHA001ALIMINLIH01	Lighting: Minutes ON Circuit 1	minutes	1	1	1	3	ABS (last value - first value) of **LEHA001ALIMINLIM01** in the specific time interval
2	LEHA001ALIMINLIH02	Lighting: Minutes ON Circuit 2	minutes	1	1	1	3	ABS (last value - first value) of **LEHA001ALIMINLIM02** in the specific time interval
3	LEHA001ALIMINLIH03	Lighting: Minutes ON Circuit 3	minutes	1	1	1	3	ABS (last value - first value) of **LEHA001ALIMINLIM03** in the specific time interval
4	LEHA001ALIMINLIH04	Lighting: Minutes ON Circuit 4	minutes	1	1	1	3	ABS (last value - first value) of **LEHA001ALIMINLIM04** in the specific time interval
5	LEHA001ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **LEHA001ATIROOTEM01** in the specific time interval
6	LEHA001ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **LEHA001ATIROOTES01** in the specific time interval
7	LEHA001OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	[Number of events that (**LEWC013OCCPRESEM01>0 OR LEWC013OCCPRESEM02>0)] * 5 [minutes]**
8	LEHA001RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	3	ABS (last value - first value) of **LEHA001RADMINVAM01** in the specific time interval
9	LEHA001RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	3	ABS (last value - first value) of **LEHA001RADMINVAM02** in the specific time interval
10	LEHA001WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **LEHA001WINWIOPEM01 > 0**] * 5 [minutes], in the specific time interval

	Label	Entrance, Lobby, Corridors	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.42 - Data received by DOKI - Data Transmission = 5 minutes.
11	LEHA001ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**[Circuit1]+[Circuit2]+[Circuit3]+[Circuit4].=(11x4x18W)+(4x58W)+(2x58W)+(2x58W) = 1256 [W]** **Circuit1 = [LEHA001ALIMINLIH01 * TotalWatt_C1]/1000; TotalWatt_C1 = (11 x 4 x 18W) = 792 [W]** **Circuit2 = [LEHA001ALIMINLIH02 * TotalWatt_C2]/1000; Totalwatt_C2 = (4 x 58W) = 232 [Watt]** **Circuit3 = [LEHA001ALIMINLIH03 * TotalWatt_C3]/1000; Totalwatt_C3 = (2 x 58W) = 116 [Watt]** **Circuit4 = [LEHA001ALIMINLIH04 * TotalWatt_C4]/1000; Totalwatt_C4 = (2 x 58W) = 116 [Watt]**
12	LEHA001THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[(LEHA001RADMINVAM01 + LEHA001RADMINVAM02) * N.Power]/1000; N.Power = 1097 [Watt]**
13	LEHA001ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		**[LEHA001ATIROOTEH01 > LEHA001ATIROOTES01]** AND [**LEHA001RADMINVAH01>0** OR **LEHA001RADMINVAH02>0**]
14	LEHA001WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[LEHA001WINWIOPEH01>0 AND (LEHA001RADMINVAH01>0 OR LEHA001RADMINVAH02>0]**
15	LEHA001OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**LEHA001OCCROWOWM01<>0 OR LEHA001OCCROWOWM02<>0**] in the specific time interval
16	LEHA001ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[(LEHA001ALIMINLIH01>0 OR LEHA001ALIMINLIH02>0 OR LEHA001ALIMINLIH03>0 OR LEHA001ALIMINLIH04>0) AND LEHA001OCCPRESEH01=0]** in the interval
17	LEHA001THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
18	LEHA001THCLTHSOH01	Last time heating system OFF	timestamp			1		The last time the heating system is turned OFF during the whole day.
			TOTALS	**16**	**16**	**17**	**29**	
				78				

Figure 4-14: Entrance, Lobby, Corridors - physical measurement and HQDS variables.

	Label	Meteo data	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.42 - Data received by DOKI - Data Transmission = 5 minutes.
1	LEPILOTATEEXTTEM01	External Temperature	°C		1		1	
				0	**1**	**0**	**1**	

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	LEPILOTATEEXTTEH01	External Temperature	°C	1	1	1	3	Average among all value in the specific time interval
			TOTALS	**6**				

	Label	Pilot: Electrical Measurement	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.43 - Data received by DOKI - Data Transmission = 5 minutes.
1	LEPP001ELCENRGYM01	Electricity Consumption	kWh		1		**1**	Cumulative from the installation. Active Energy
2	LEPP001ELCPOWERM01	Electrical Power	Watt		1		**1**	Actual Value. Active Power
3	LEPP001ELCRERGYM01	Reactive Energy	KVarh		1		**1**	Cumulative from the installation.
4	LEPP001ELCROWERM01	Reactive Power	Kvar		1		**1**	Actual Value.
5	LEPP001ELCAMPERM01	Electrical Current - Phase 1	Ampere		1		**1**	It is used only by IES for calibration of the building model
6	LEPP001ELCAMPERM02	Electrical Current - Phase 2	Ampere		1		**1**	It is used only by IES for calibration of the building model
7	LEPP001ELCAMPERM03	Electrical Current - Phase 3	Ampere		1		**1**	It is used only by IES for calibration of the building model
8	LEPP001ELCVOLTAM01	Voltage - Phase1	Volt		1		**1**	It is used only by IES for calibration of the building model
9	LEPP001ELCVOLTAM02	Voltage - Phase2	Volt		1		**1**	It is used only by IES for calibration of the building model
10	LEPP001ELCVOLTAM03	Voltage - Phase3	Volt		1		**1**	It is used only by IES for calibration of the building model
				0	**10**	**0**	**10**	

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	LEPP001ELCENRGYH01	Energy Consumption	kWh	1	1	1	**3**	(last value - first value) of **LEPV001ELCENRGYM01** (Active) in the specific time interval
2	LEPP001ELCPOWERH01	Electrical Power	Watt	1	1	1	**3**	Average among all value of **LEPV001ELCPOWERM01** (Active) in the specific time interval
3	LEPP001ELCROWERH01	Pilot Reactive Power	Kvar	1	1	1	**3**	average among all values of **LEPV001ELCROWERM01** in the specific time interval
4	LEPP001ELCROWERH02	Reactive Eenergy	KVarh	1	1	1	**3**	(last value - first value) of **LEPV001ELCRERGYM01** in the specific time interval
5	LEPP001ELCLITOTH01	Total Lighting Consumption	kWh	1	1	1		To be calculated daily: [Sum(LExxxxxALIERGxxH01)]
6	LEPP001ELCLILEDH01	Total LED Lighting Consumption	kWh	1	1	1		To be calculated daily: [Sum(LExxxxxALIERGCLH01)] for the 4 rooms with LED lighting
7	LEPP001ELCLILFLUH01	Total Traditional Lighting Consumption	kWh	1	1	1		To be calculated daily: [LEPV001ELCLITOTH01]-[LEPV001ELCLILEDH01]
8	LEPP001ELCLILDIMD01	Total Lighting Consumption with Dimming	kWh	1	1	1		To be calculated daily: [Sum(LExxxxxALIERGCLH01)] for the 3 rooms with dimming
9	LEPP001ELCTOKPIH01	Electricity Consumption Indicator	kWh/m²			1		To be calculated daily: [LEPV001ELCENRGYH01]/[Pilot.surface]
10	LEPP001ELCLIKPIH01	Lighting Energy Indicator	kWh/m²			1		To be calculated daily: [LEPV001ELCLITOTH01]/[Pilot.surface]
11	LEPP001THCHETOTH01	Thermal Energy Consumption	kWh/m²			1		To be calculated dailyVSN: [Sum(LExxxxxTHCENRGYH01)]
12	LEPP001THCHEKPIH01	Thermal Energy Consumption Indicator	kWh/m²			1		To be calculated daily: [LEPV001THCHETOTH01]/[Pilot.surface]
			TOTALS	**8**	**8**	**12**	**12**	
				40				

Figure 4-15: Meteo and Pilot Electrical measurement - physical measurement and HQDS variables.

	Label	School: Electrical & Thermal Measurement	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.44 - Data received by DOKI - Data Transmission = 5 minutes.
1	LEPS001ELCENRGYM01	Electricity Consumption	kWh		1		1	Cumulative from the installation. Active Energy
2	LEPS001ELCPOWERM01	Electrical Power	Watt		1		1	Actual Value. Active Power
3	LEPS001ELCRERGYM01	Reactive Energy	KVarh		1		1	Cumulative from the installation.
4	LEPS001ELCROWERM01	Reactive Power	Kvar		1		1	Actual Value.
5	LEPS001ELCAMPERM01	Electrical Current - Phase 1	Ampere		1		1	It is used only by IES for calibration of the building model
6	LEPS001ELCAMPERM02	Electrical Current - Phase 2	Ampere		1		1	It is used only by IES for calibration of the building model
7	LEPS001ELCAMPERM03	Electrical Current - Phase 3	Ampere		1		1	It is used only by IES for calibration of the building model
8	LEPS001ELCVOLTAM01	Voltage - Phase1	Volt		1		1	It is used only by IES for calibration of the building model
9	LEPS001ELCVOLTAM02	Voltage - Phase2	Volt		1		1	It is used only by IES for calibration of the building model
10	LEPS001ELCVOLTAM03	Voltage - Phase3	Volt		1		1	It is used only by IES for calibration of the building model
				0	**10**	**0**	**10**	

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	LEPS001ELCENRGYH01	Electricity Consumption	kWh	1	1	1	3	(last value - first value) of **LEPS001ELCENRGYM01** (Active) in the specific time interval
2	LEPS001ELCPOWERH01	Electrical Power	Watt	1	1	1	3	Average among all value of **LEPS001ELCPOWERM01** (Active) in the specific time interval
3	LEPS001ELCROWERH02	Reactive Eenergy	KVarh	1	1	1	3	(last value - first value) of **LEPS001ELCRERGYM01** in the specific time interval
4	LEPS001ELCROWERH01	Reactive Power	KVarh	1	1	1	3	average among all values of **LEPP001ELCROWERM01** in the specific time interval
5	LEPS001ELCPOMAXH01	MAX Electrical Power	Watt			1		MAX value of **LEPP001ELCPOWERM01** of the day
6	LEPS001ELCROMAXH01	MAX Reactive Power	Kvar			1		MAX value of **LEPP001ELCROWERM01** of the day
7	LEPS001ELCENRPKH01	Electric Consumption during Peak Hours	kWh			1		To be calculated daily
8	LEPS001ELCENOPKH01	Electric Consumption OFF-Peak Hours	kWh			1		To be calculated daily
9	LEPS001ELCTOKPIH01	Electrical Energy Indicator (consumption)	kWh/m²			1		To be calculated daily: [**LEPP001ELCENRGYH01**]/[School.surface]
10	LEPS001THCENRGYH01	Thermal Energy Consumption	kWh			1		last value 12 months of gas consumption converted in [kWh]
11	LEPS001THCTNKPIH01	School Thermal Energy Indicator	kWh/m²			1		To be calculated daily: [**LEPP001THCENRGYH01**]/[School.surface]
		TOTALS		**4**	**4**	**11**	**12**	
				31				

	Label	Renewable Energy: PV Plant	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.45 - Data received by DOKI - Data Transmission = 5 minutes.
1	LEPV001PVCENRGYM01	Electricity Production (PV)	kWh		1		1	Cumulative from the installation
				0	**1**	**0**	**1**	

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	LEPV001PVCENRGYH01	Electricity Production (PV)	kWh	1	1	1	3	(last value - first value) in the specific time interval
2	LEPV001ELCTNKPIH02	Electrical Energy Indicator (with Renewables)	kWh/m²			1		To be calculated daily: [LEPP001ELCENRGYH01 - LEPV001PVCENRGYH01]/[School.surface]
		TOTALS		**1**	**1**	**2**	**3**	
				7				

Figure 4-16: School and PV Plant Electrical measurement - physical measurement and HQDS variables.