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DELIVERABLE

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D6.1 Pilots Implementation:
Annex C – PLOVDIV 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 C – PLOVDIV Pilot

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

Document Control

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

File Reference: **D6.1 Annex C – PLOVDIV Pilot**

Statement of originality:

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Version Control Record

Rev.	Date	Description	Author
V4.1	03/07/2014	Revised Final Version	AGa
V4.0	11/12/2012	Final Version	AGa
V3.1	07/12/2013	Review of the final version	Pon, LAd
V3.0	01/12/2013	Draft version submission to the EC PO	AGa
V2.0	30/11/2013	Review Appendix C: PLOVDIV Pilot	LAd
V1.0	20/11/2013	First document delivered for comments and additional content.	POn

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1. PLOVDIV Pilot

1.1 The site

Professional School for Electrotechnics and Electronics (PSEE) is an elite government high school with local significance for the education of young people in the sphere of high education. PSEE has been providing qualified teachers for 40 years. Its professional training is consistent with the requirements of high education standards. Future technicians in electrotechnical Industry, information technology and electronics are prepared in the school.

PSEE is a two buildings complex located in West district of Plovdiv, built in 1962 and renovated in 1985. Moreover, the School was refurbished partially, with the change of windows in 2008 (still ongoing action) and the improvement of the heating system in 2012. First buildings has total built area of 1,400 m^2, the second one has 1,100 m^2. There is a third building bridging the two buildings that has 400 m^2 built area. The total built area is 2,900 m^2, the total floor area is 8,646 m^2, heating volume is 26,388 m^2. The PSEE outdoor area is 17,656 m^2. During the school year PSEE hosts an average of 939 people.

The Pilot area proposed for the VERYSchool project is part of the 3rd floor, with a net indoor area of about 1000 m^2. **Pilot** consist of classrooms, laboratories, library, corridors and stairs and WC-s. Pilot area hosts approximately 210 people. In the beginning of 2013 the New building No3 was closed for renovation. (the closed building area is approximately 1.822m^2)

Item	BUILDING DATA	PILOT DATA	Item	BUILDING DATA	PILOT DATA
Gross indoor area [m^2]:	9,887	1090	Gross indoor volume [m^3]:	32,591	3902,2
Net indoor area [m^2]	9,245	1000	Net indoor volume[m^3]:	30,649	3580
Number of Building floors:	3 and 4	Part of the 3-rd floor	Envelope area A [m^2]:	8,334	1,035
Gross Windows surface [m^2]:	2.172	269	Net heated area [m^2]:	8,023	1000
Gross floor height [m]:	3,7,3,52, 3,37, 3,27- others	3.58	Net heated space volume [m^3]:	26,598	3580
Net floor height [m]:	3,45, 3,25, 3,10, 3,0- others	3,25 average	Air- conditioned area [m^2]:	549,04	102,24
Total building height [m]:	14.95	14.95	Air- conditioned space volume [m^3]:	1783,60	352,50

Building data of Lisbon School and Pilot area

The building structure

The Pilot selected building

New Windows

1.2 Pilot area selection

The selected area includess 3 classrooms, 5 laboratories, 1 library, 2 auxiliary offices, 2 lobbies, 3 corridors and 2 bathrooms.

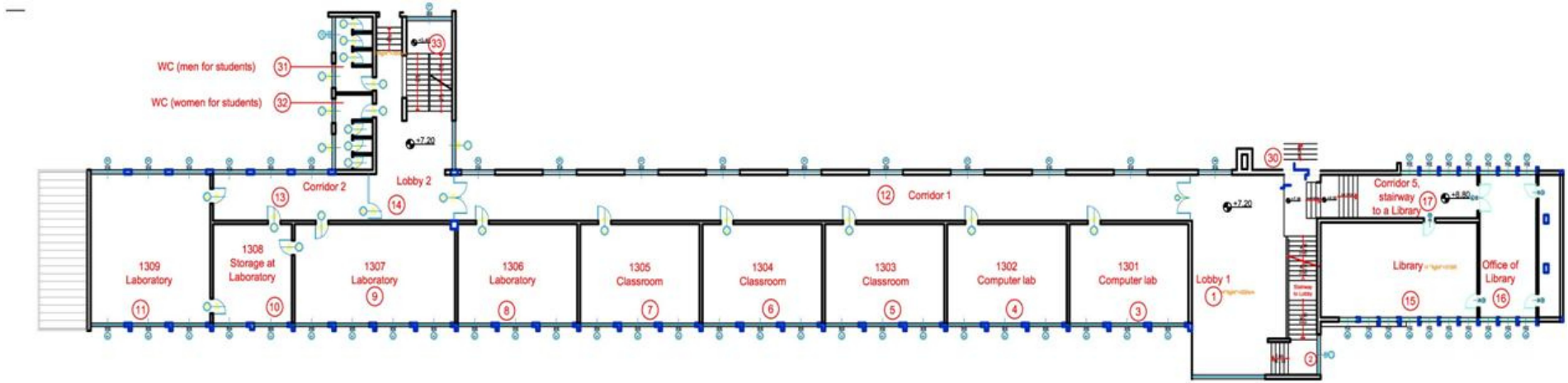


Figure 1-1: Plovdiv School: 3rd floor Rooms and exsisting provisions

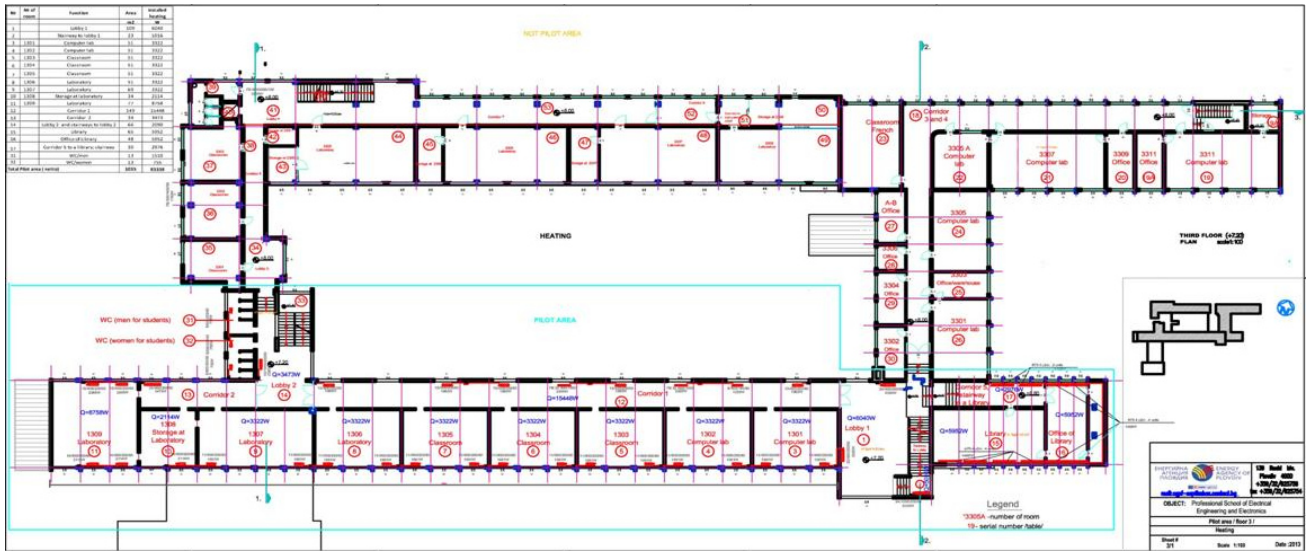


Figure 1-2: Plovdiv School: 3rd floor heating plant (Pilot in blue lines)

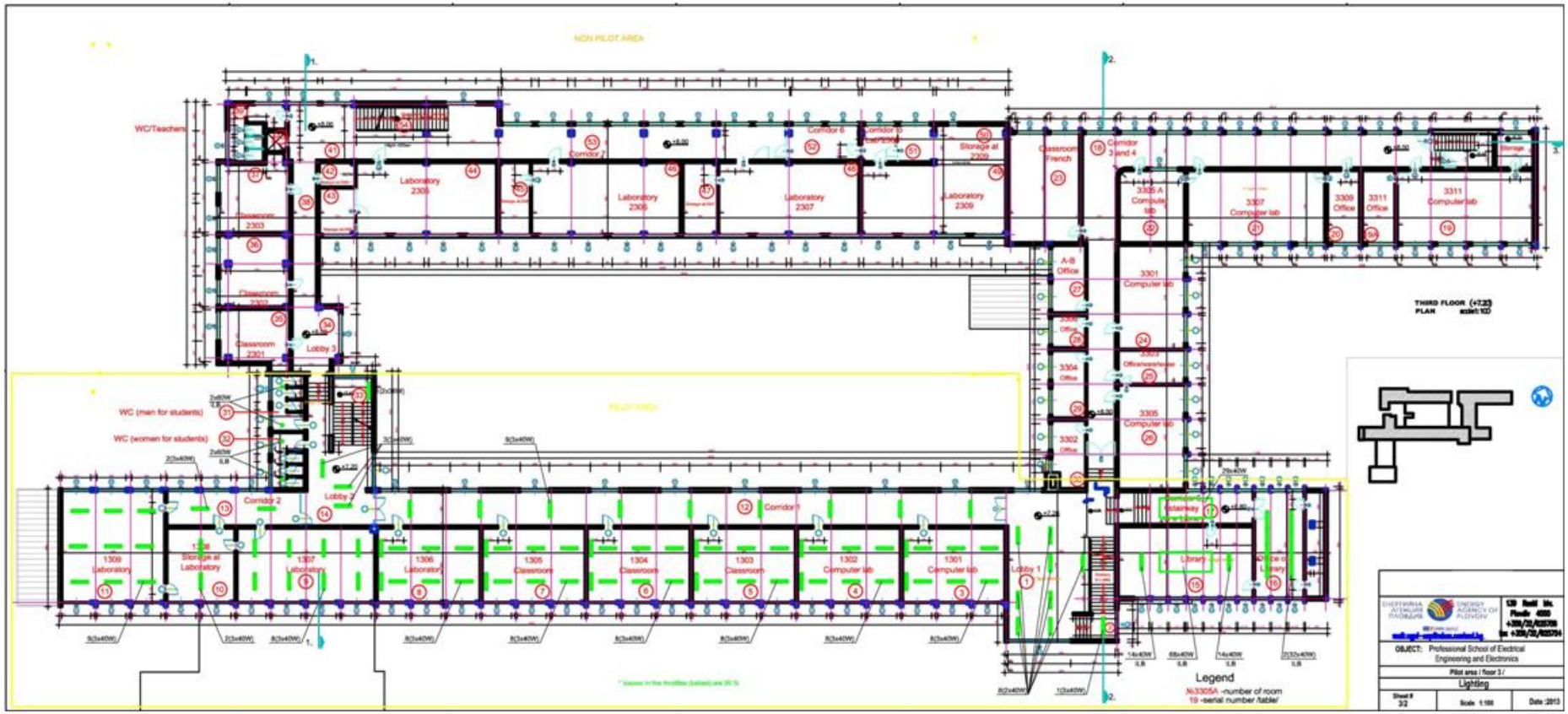


Figure 1-3: Plovdiv School: 3rd floor lighting plant (Pilot in yellow lines)

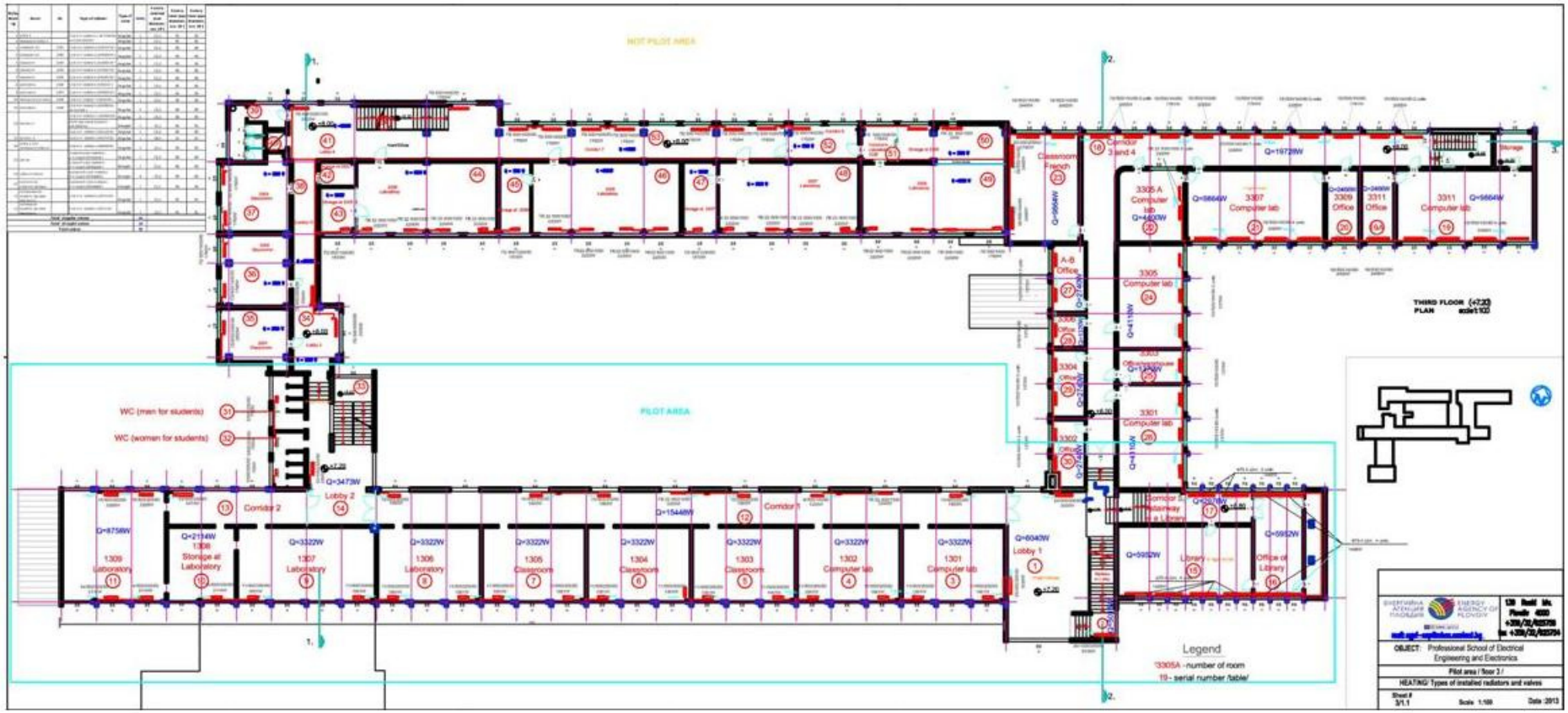


Figure 1-4: Plovdiv School: 3rd floor installed radiators and valves (Pilot area in blue)

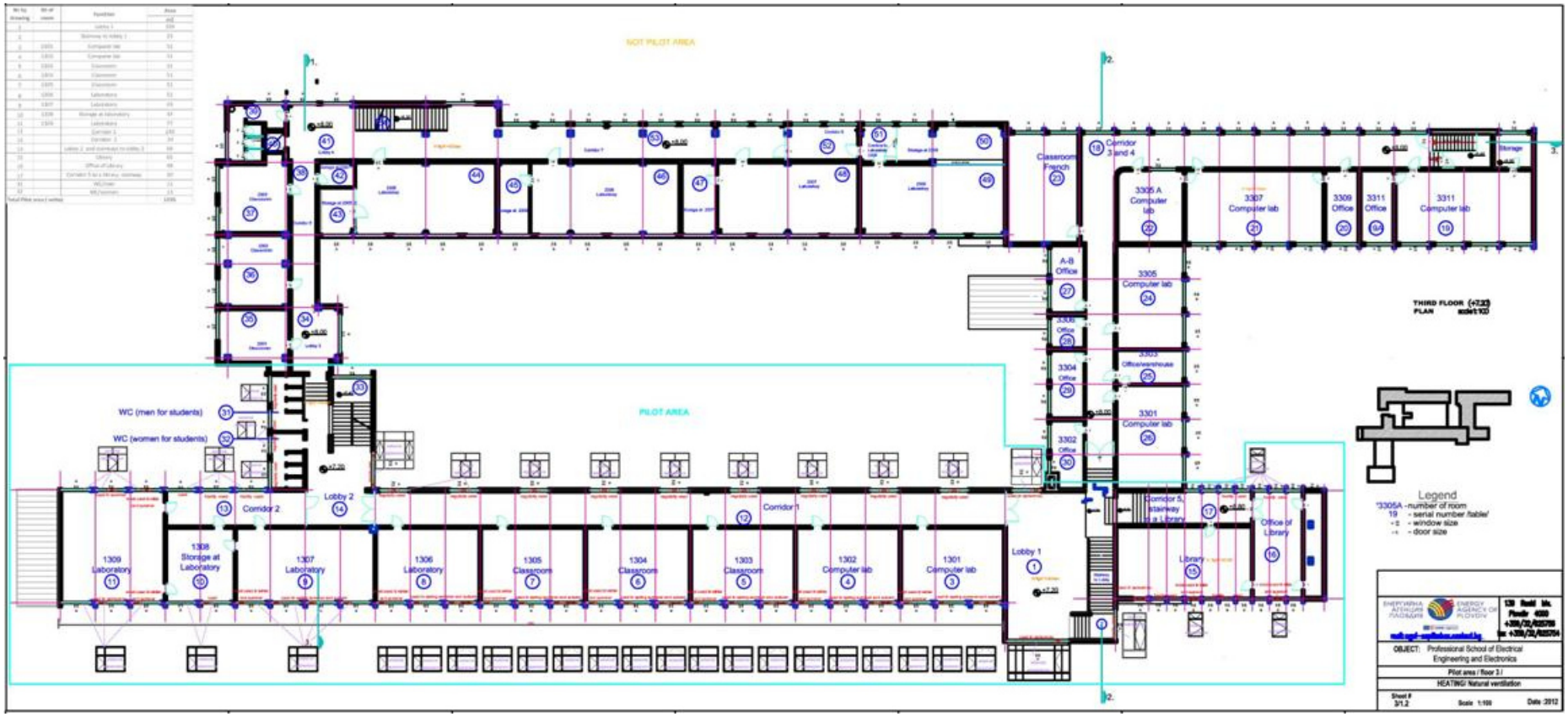


Figure 1-5: Plovdiv School: 3rd floor windows plant (Pilot area in blue lines)

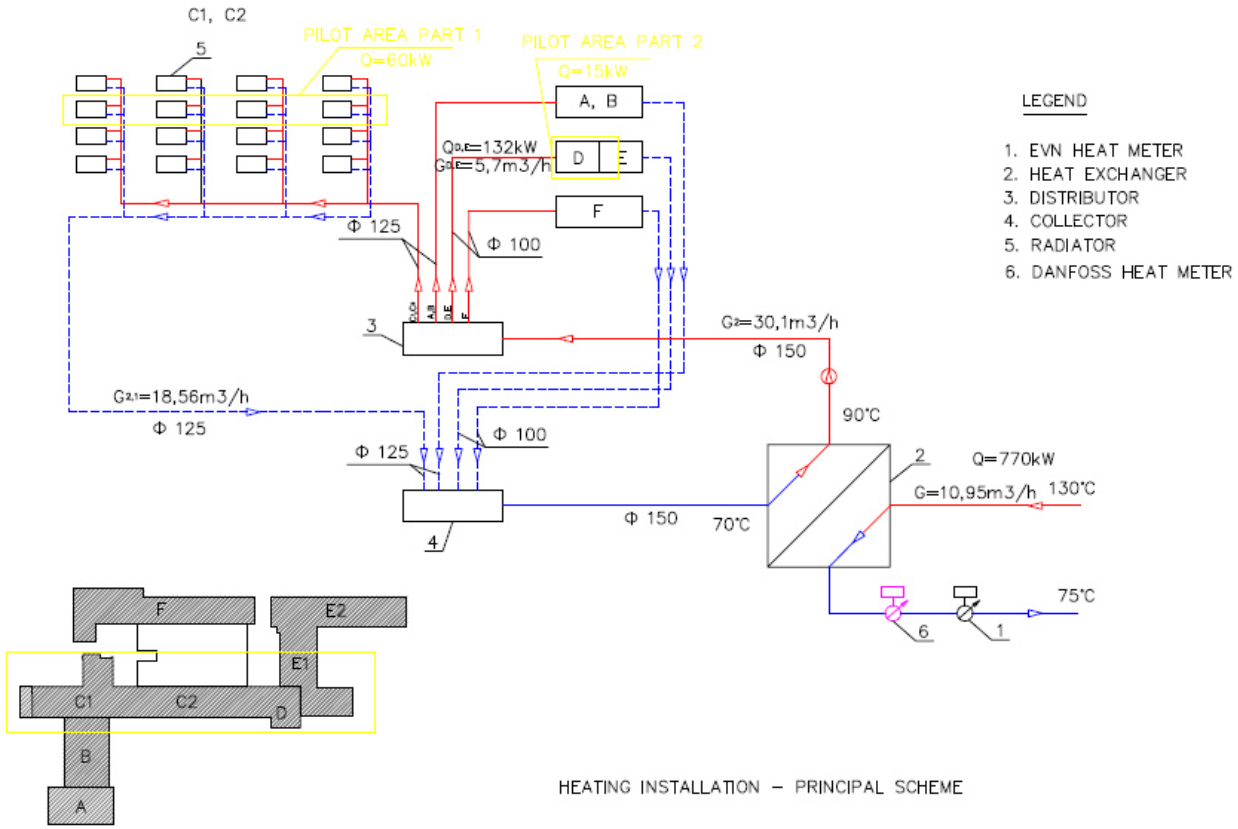


Figure 1-6:Principle scheme of heating installation of PSEE

1.3 Documentation of the installation

This section describes the documentation prepared for the Pilot with the objective of enabling the installer to perform the specific tasks while minimizing the possibility of errors. Moreover, the whole set of documentation details drawings, layouts, technical specification of equipment to facilitate choices and installing activities.

More in detail, the whole set of documentation includes:

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

PILOT : Plovdiv	
ROOM : SYSTEM	
Bill of Material	
PC Navigator	DOKI CODE: xxxx
Monitor M12	DOKI CODE : 478301504
PC SHOT 520E	DOKI CODE : 463301603
Power Supply	DOKI CODE : 019004022
DOKIGATE	DOKI CODE : 463301601
SWITCH 1	Consumer
SWITCH 2	Consumer
1301	BOX DOKI 01 DOKI CODE : 463300101
1302	BOX DOKI 01 DOKI CODE : 463300101
1303	BOX DOKI 01 DOKI CODE : 463300101
1304	BOX DOKI 01 DOKI CODE : 463300101
1305	BOX DOKI 01 DOKI CODE : 463300101
1306	BOX DOKI 01 DOKI CODE : 463300101
1307	BOX DOKI 01 DOKI CODE : 463300101
1308	BOX DOKI 01 DOKI CODE : 463300101
1309	BOX DOKI 01 DOKI CODE : 463300101
CORRIDOR1	BOX DOKI 01 DOKI CODE : 463300101
CORRIDOR2	BOX DOKI 01 DOKI CODE : 463300101
LIBRARY	BOX DOKI 01 DOKI CODE : 463300101
LOBBY1	BOX DOKI 01 DOKI CODE : 463300101
LOBBY2	BOX DOKI 01 DOKI CODE : 463300101
OFFICE OF LIBRARY	BOX DOKI 01 DOKI CODE : 463300101
WC1 WOMAN	BOX DOKI 01 DOKI CODE : 463300101
WC2 MAN	BOX DOKI 01 DOKI CODE : 463300101
CORRIDOR 5 STAIRWAY	BOX DOKI 01 DOKI CODE : 463300101
POWER PLANT1	BOX DOKI POWER PLANT DOKI CODE : 463300103
POWER PLANT2	BOX DOKI POWER PLANT DOKI CODE : 463300103
POWER PLANT3	BOX DOKI POWER PLANT DOKI CODE : 463300103
POWER PLANT4	BOX DOKI POWER PLANT DOKI CODE : 463300103

- a table which details for every BOX Module of the pilot the pre-setting settled up in the factory, including the DIP switches presets, the IP address, the ID Plovdiv BOX code. In other words every BOX DOKI has been coupled with a IP address (Board IP and WIFI IP) and with the values of DIP Switches 1, 2 and 3 to set up the behavior of the module.

BOX Label	article	Order Code	Incr	BOARD IP	WIFI IP	ID	NAME	NOME FILE	DIP 1	DIP 2	DIP 3	FW
BOX DOKI 01	463300101	330575	1	10.0.1.11		1301	PLOVDIV	PLOVDIV_1301	97	1	0	2.0.5.18
BOX DOKI 01	463300101	330575	2	10.0.1.12		1302	PLOVDIV	PLOVDIV_1302	97	2	0	2.0.5.18
BOX DOKI 01	463300101	330575	3	10.0.1.13		1303	PLOVDIV	PLOVDIV_1303	97	3	0	2.0.5.18
BOX DOKI 01	463300101	330575	4	10.0.1.14		1304	PLOVDIV	PLOVDIV_1304	97	4	0	2.0.5.18
BOX DOKI 01	463300101	330575	5	10.0.1.15		1305	PLOVDIV	PLOVDIV_1305	97	5	0	2.0.5.18
BOX DOKI 01	463300101	330575	6	10.0.1.16		1306	PLOVDIV	PLOVDIV_1306	97	6	0	2.0.5.18
BOX DOKI 01	463300101	330575	7	10.0.1.17		1307	PLOVDIV	PLOVDIV_1307	97	7	0	2.0.5.18
BOX DOKI 01	463300101	330575	8	10.0.1.18		1308	PLOVDIV	PLOVDIV_1308	97	8	0	2.0.5.18
BOX DOKI 01	463300101	330575	9	10.0.1.19		1309	PLOVDIV	PLOVDIV_1309	97	9	0	2.0.5.18
BOX DOKI 01	463300101	330575	10	10.0.1.20		CORRIDOR 1	PLOVDIV	PLOVDIV_CORRIDOR 1	97	10	0	2.0.5.18
BOX DOKI 01	463300101	330575	11	10.0.1.21		CORRIDOR 2	PLOVDIV	PLOVDIV_CORRIDOR 2	97	11	0	2.0.5.18
BOX DOKI 01	463300101	330575	12	10.0.1.22		LIBRARY	PLOVDIV	PLOVDIV_LIBRARY	97	12	0	2.0.5.18
BOX DOKI 01	463300101	330575	13	10.0.1.23		LOBBY 1	PLOVDIV	PLOVDIV_LOBBY 1	97	13	0	2.0.5.18
BOX DOKI 01	463300101	330575	14	10.0.1.24		LOBBY 2	PLOVDIV	PLOVDIV_LOBBY 2	97	14	0	2.0.5.18
BOX DOKI 01	463300101	330575	15	10.0.1.25		OFFICE OF LIBRARY	PLOVDIV	PLOVDIV_OFFICE OF LIBRARY	97	15	0	2.0.5.18
BOX DOKI 01	463300101	330575	16	10.0.1.26		WC1 WOMAN	PLOVDIV	PLOVDIV_WC1 WOMAN	97	16	0	2.0.5.18
BOX DOKI 01	463300101	330575	17	10.0.1.27		WC2 MAN	PLOVDIV	PLOVDIV_WC2 MAN	97	17	0	2.0.5.18
BOX DOKI 01	463300101	330575	18	10.0.1.28		CORRIDOR 5 STAIRWAY	PLOVDIV	PLOVDIV_CORRIDOR 5 STAIRWAY	97	18	0	2.0.5.18
BOX ENERGY PLANT	463300103	330574	1	10.0.1.29		THERMAL POWER PLANT 1	PLOVDIV	PLOVDIV_THERMAL POWER PLANT 1	51	19	3	2.0.6.9
BOX ENERGY PLANT	463300103	330574	2	10.0.1.30		THERMAL POWER PLANT 2	PLOVDIV	PLOVDIV_THERMAL POWER PLANT 2	51	20	3	2.0.6.9
BOX ENERGY PLANT	463300103	330574	3	10.0.1.31		THERMAL POWER PLANT 3	PLOVDIV	PLOVDIV_THERMAL POWER PLANT 3	51	21	3	2.0.6.9
BOX ENERGY PLANT	463300103	330574	4	10.0.1.32		THERMAL POWER PLANT 4	PLOVDIV	PLOVDIV_THERMAL POWER PLANT 4	51	22	3	2.0.6.9

Note: The Box with ID "THERMAL POWER PLANT 4" isn't installed but left as spare unit for future replacement in case of fault of one of the installed ones.

- a general drawing which summarizes the links between the various modules of the DOKI BEMS control network, with specific details of the type of cable to use for all connections (see next session).
- a wiring diagram for each EVO Module (both for control of rooms/premise and for the smart meters) that shows the connections to be performed and the type of cable to be used for each input or output.

2. The DOKI BEMS

2.1 Layouts: control network and Box Control Units

These are the installation schemes including all presence sensors TheBen and last wiring corrections

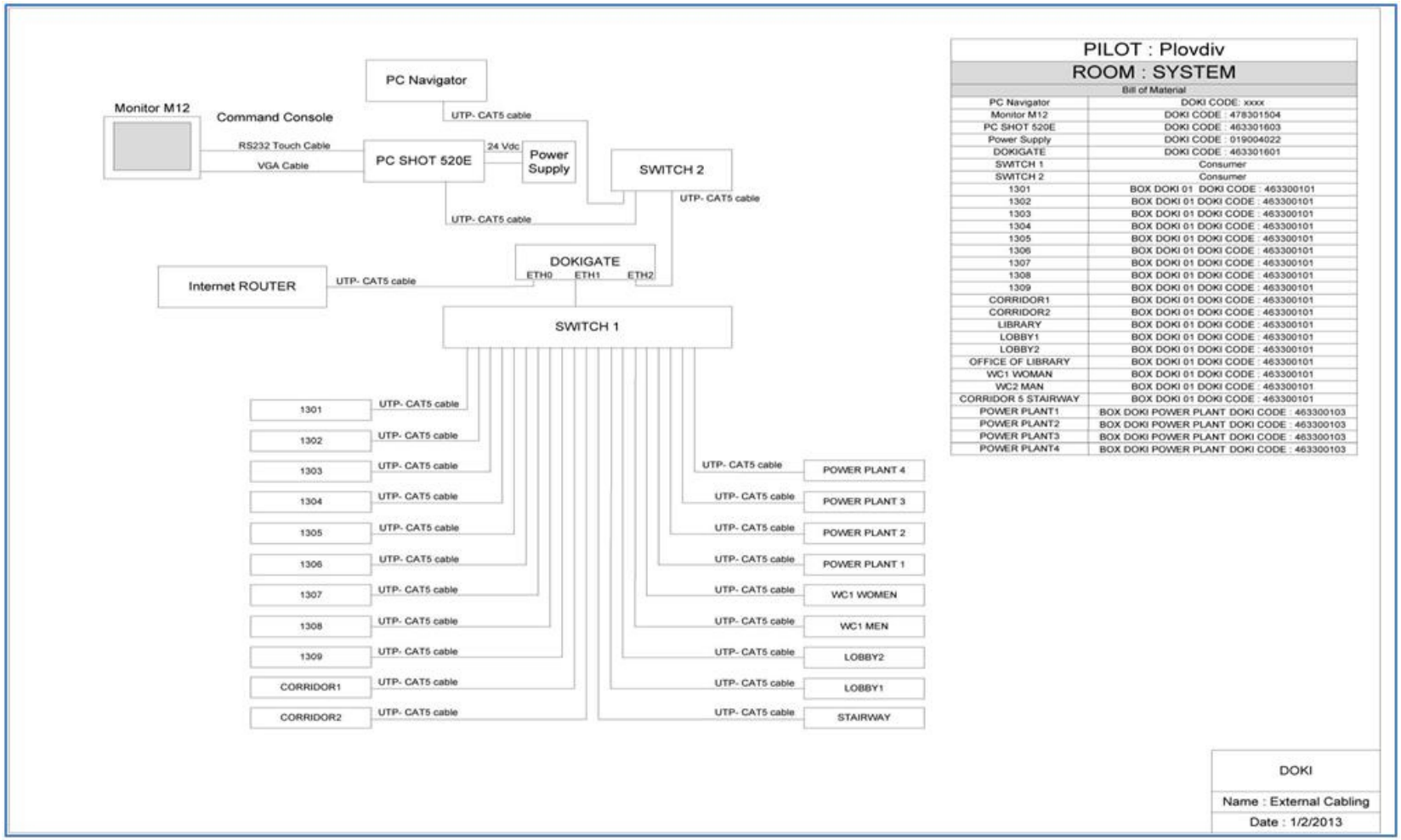


Figure 2-1: Wiring schema – Control Network

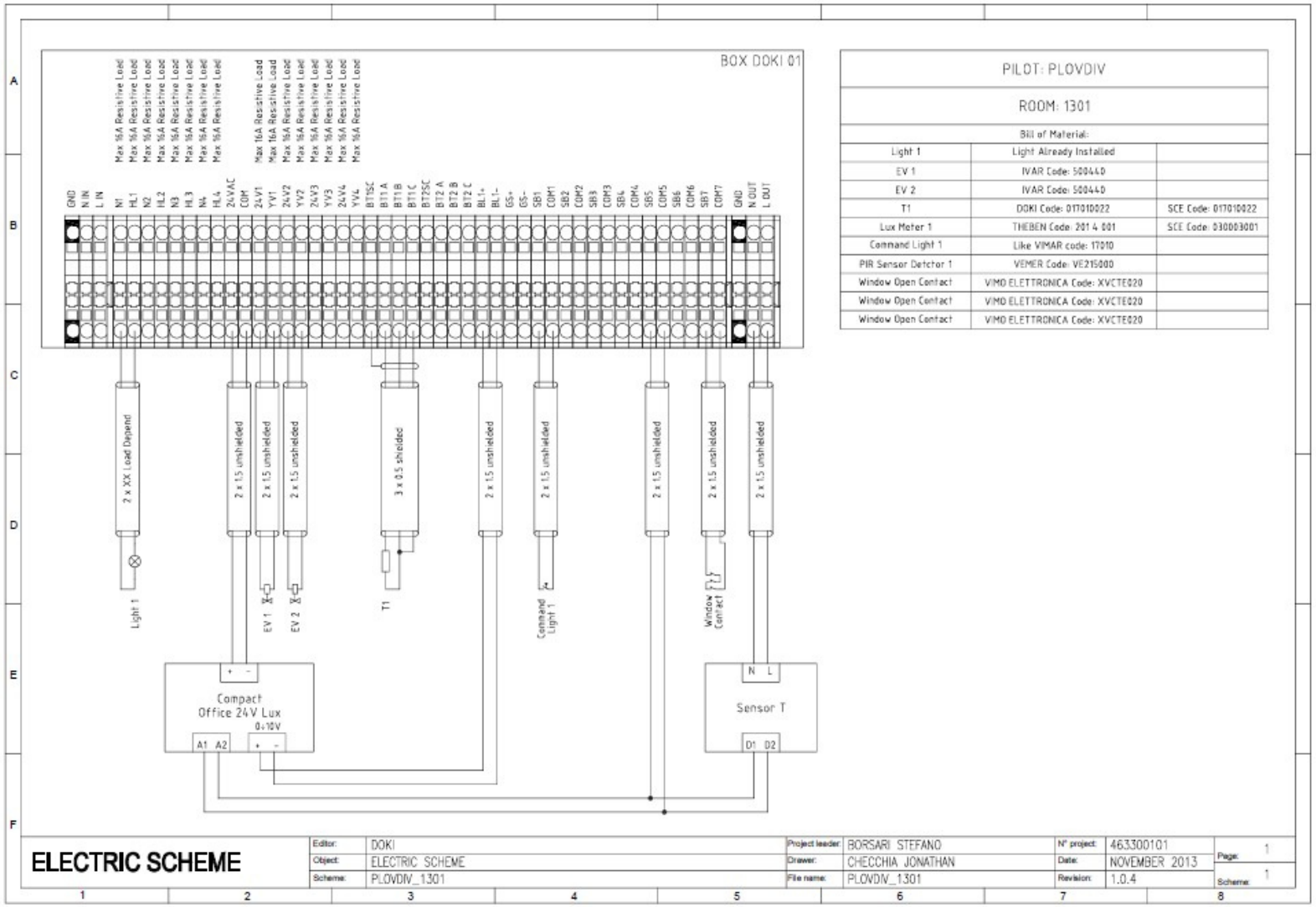


Figure 2-2: Wiring schema – Room 1301

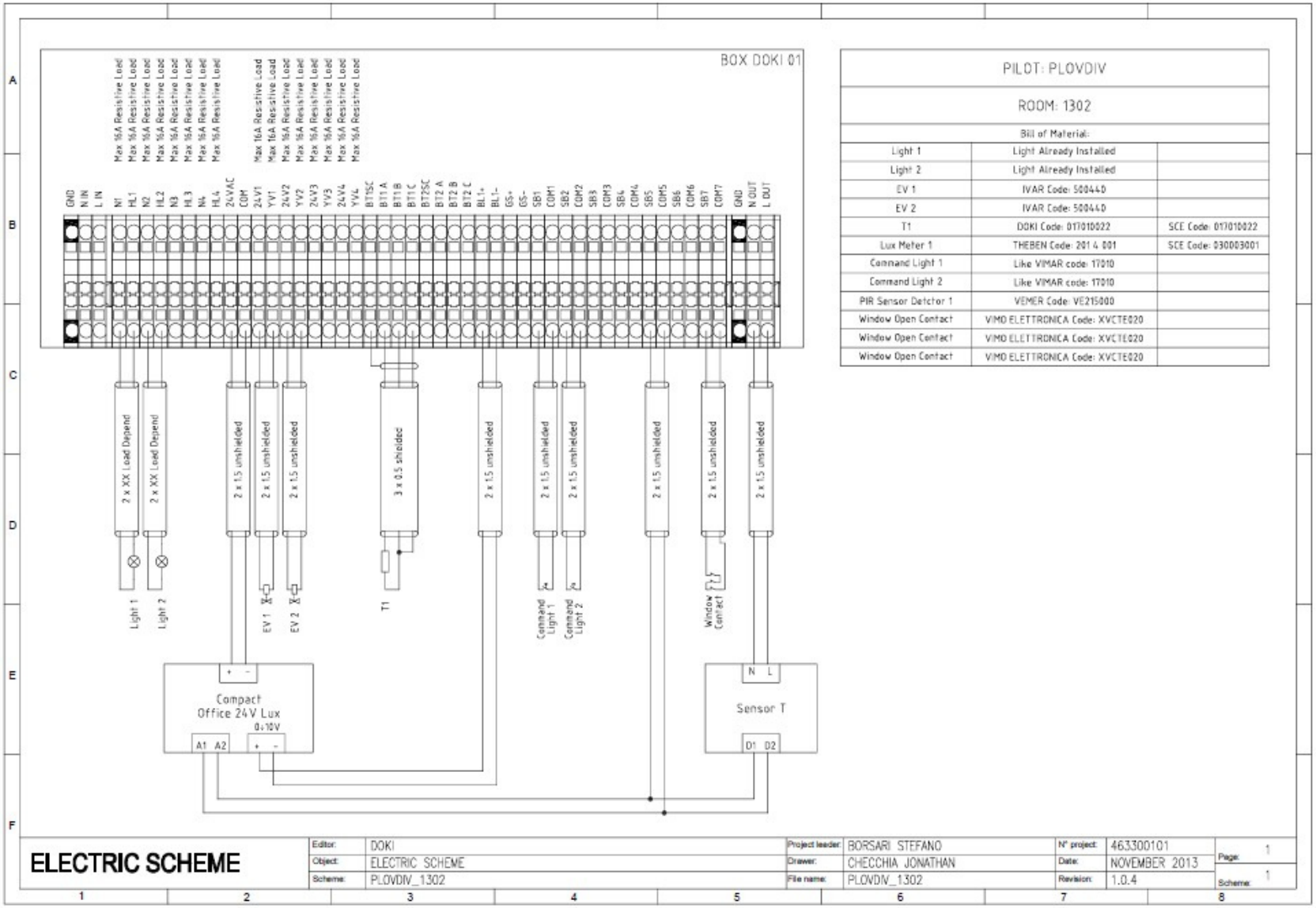


Figure 2-3: Wiring schema – Room 1302

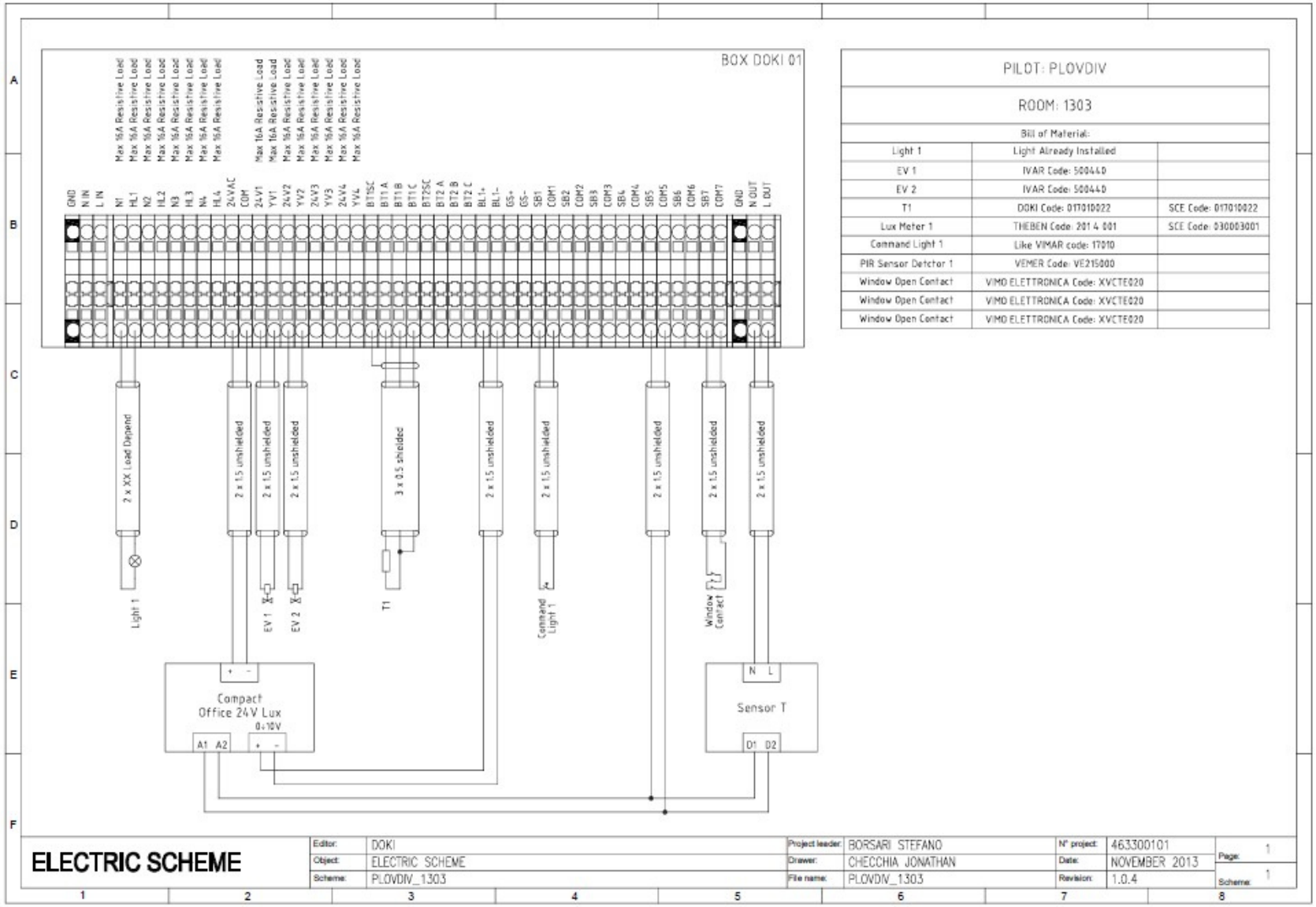


Figure 2-4: Wiring schema – Room 1303

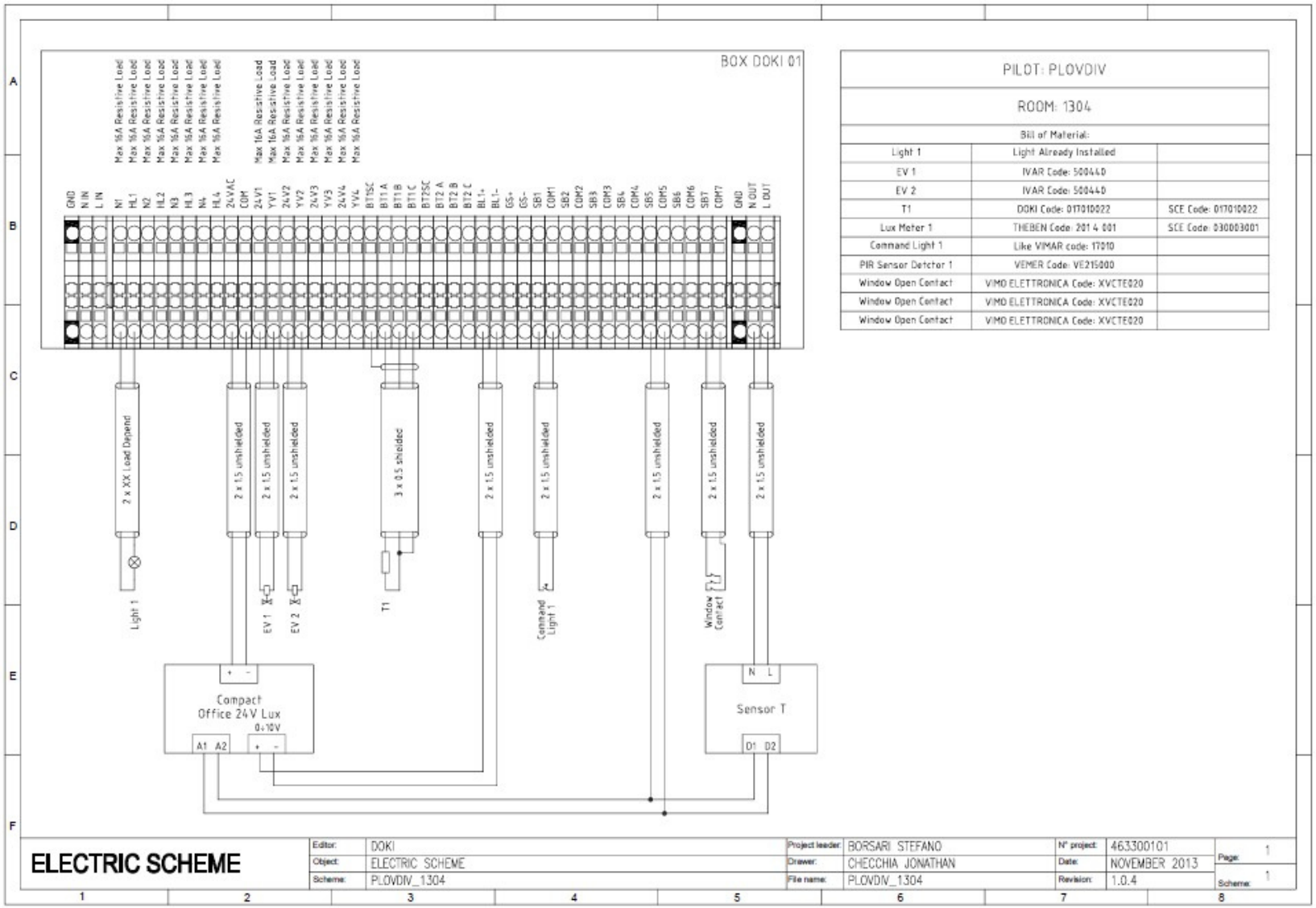


Figure 2-5: Wiring schema – Room 1304

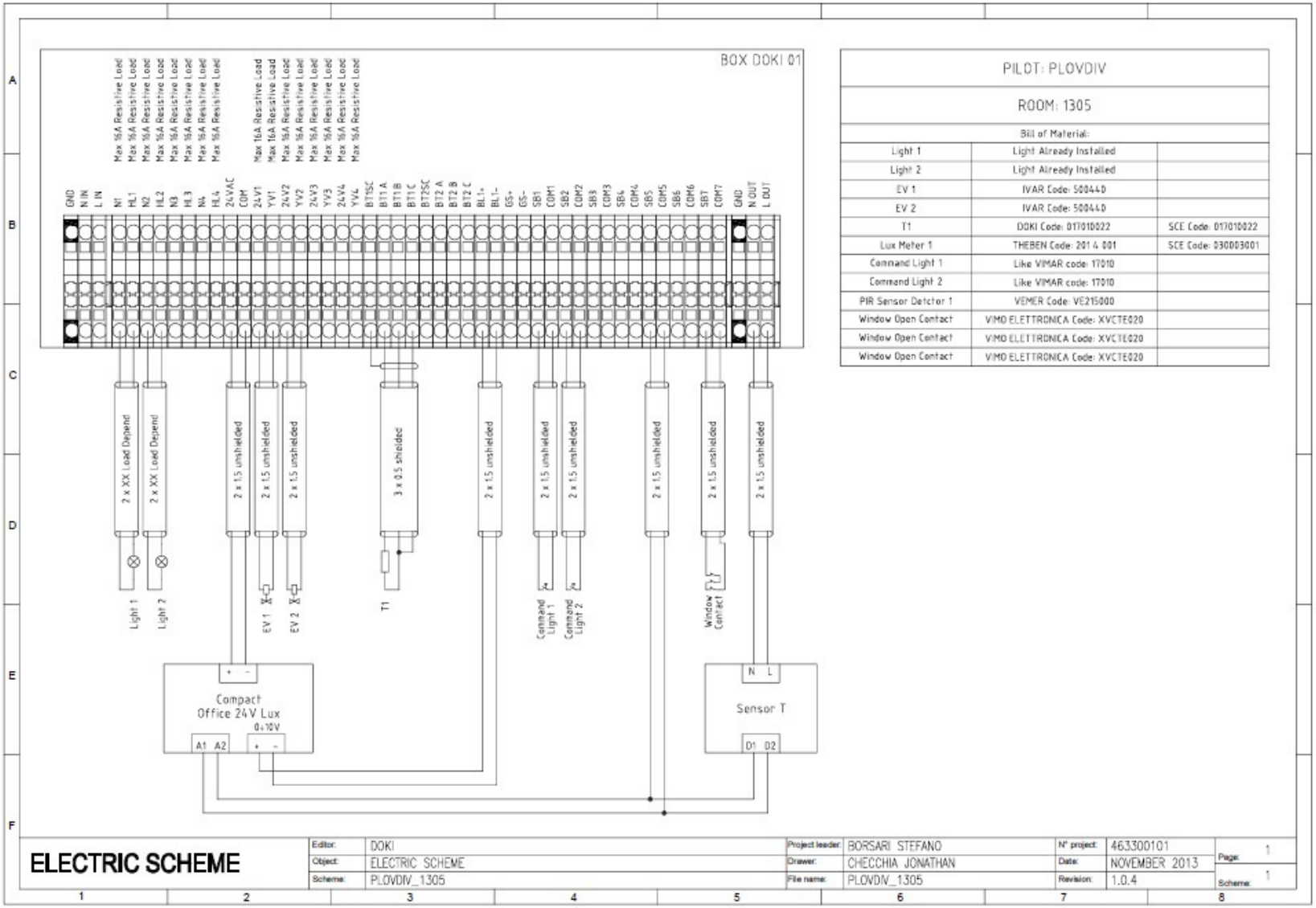


Figure 2-6: Wiring schema – Room 1305

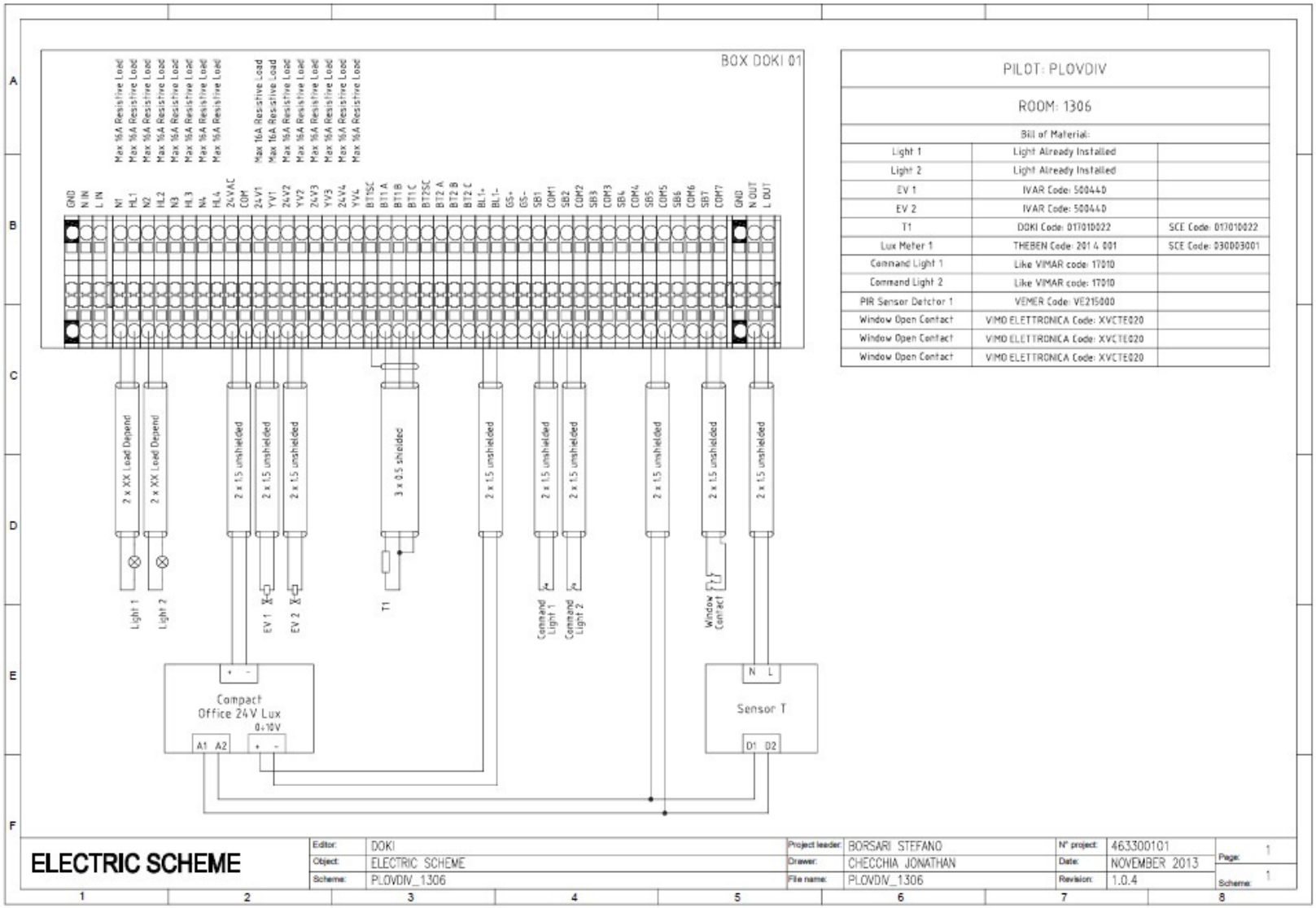


Figure 2-7: Wiring schema – Room 1306

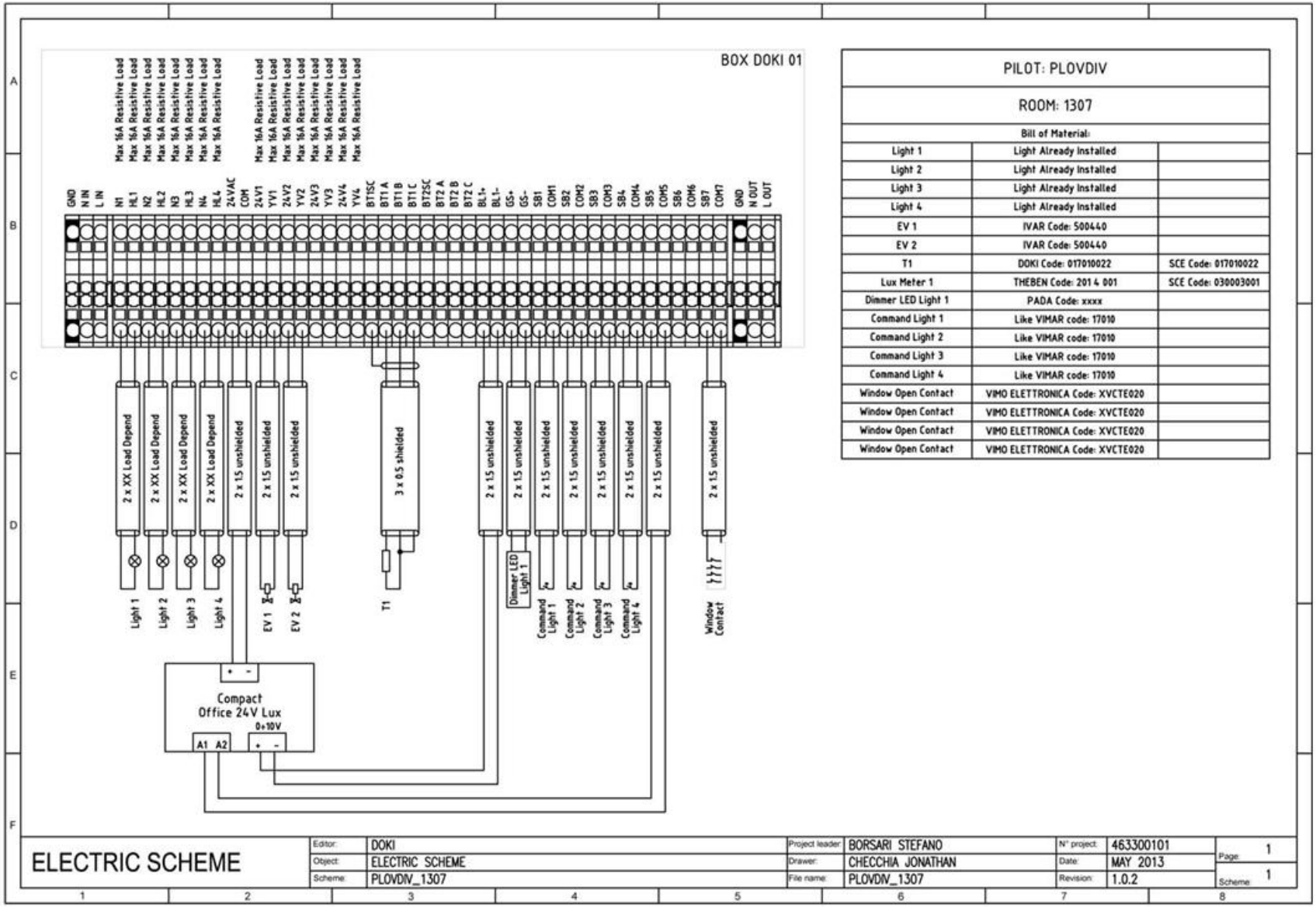


Figure 2-8: Wiring schema – Room 1307

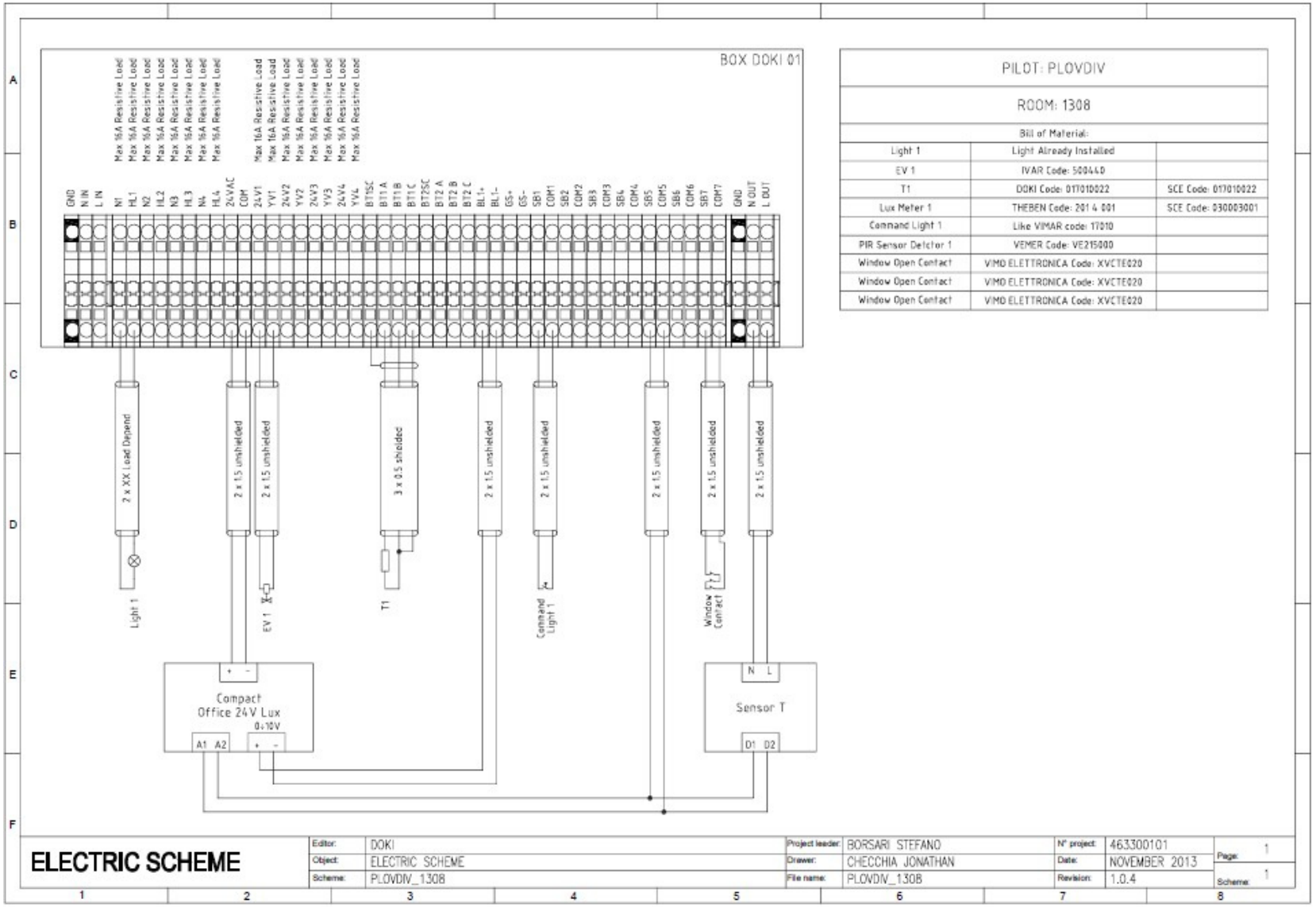


Figure 2-9: Wiring schema – Room 1308

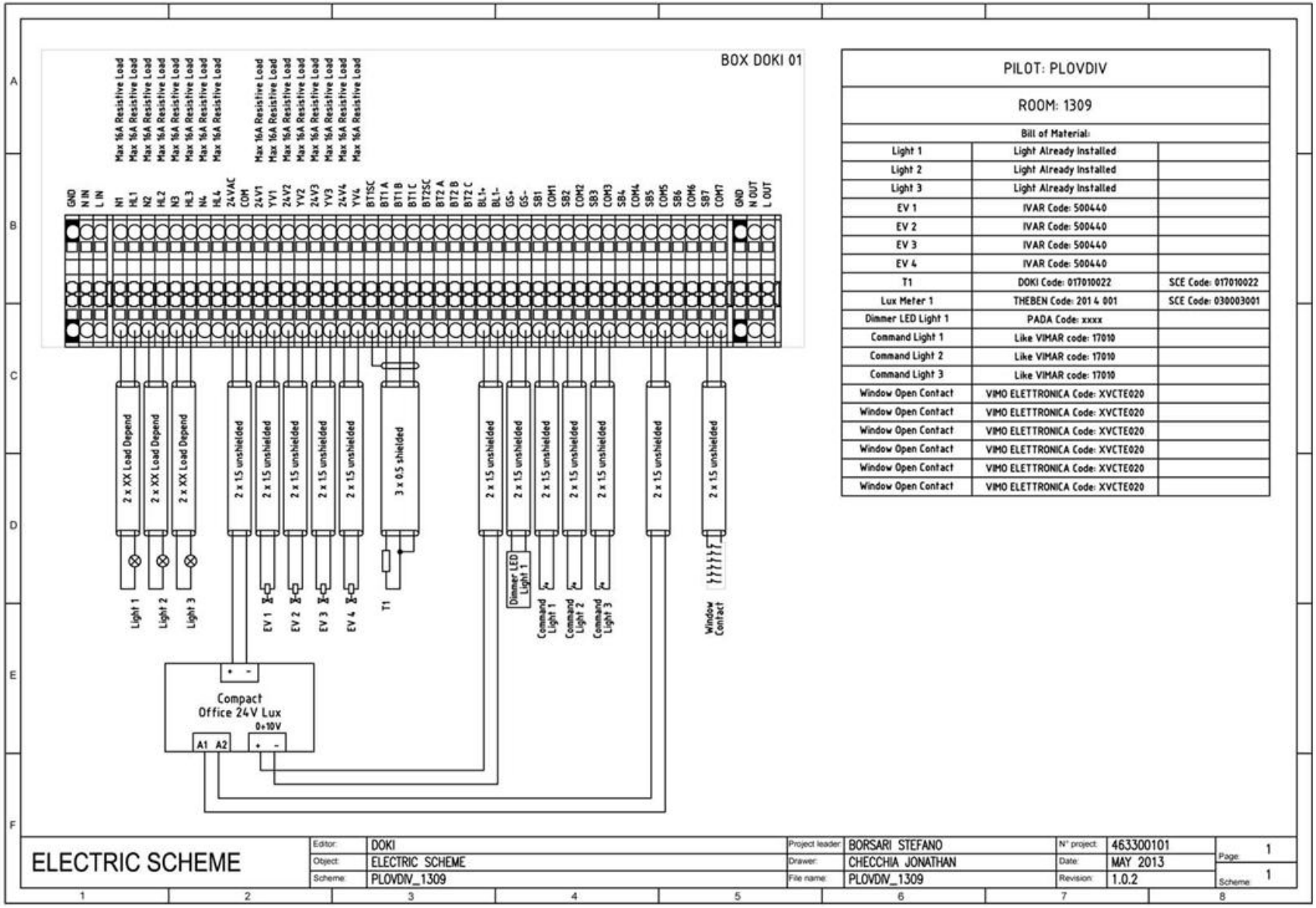


Figure 2-10: Wiring schema – Room 1309

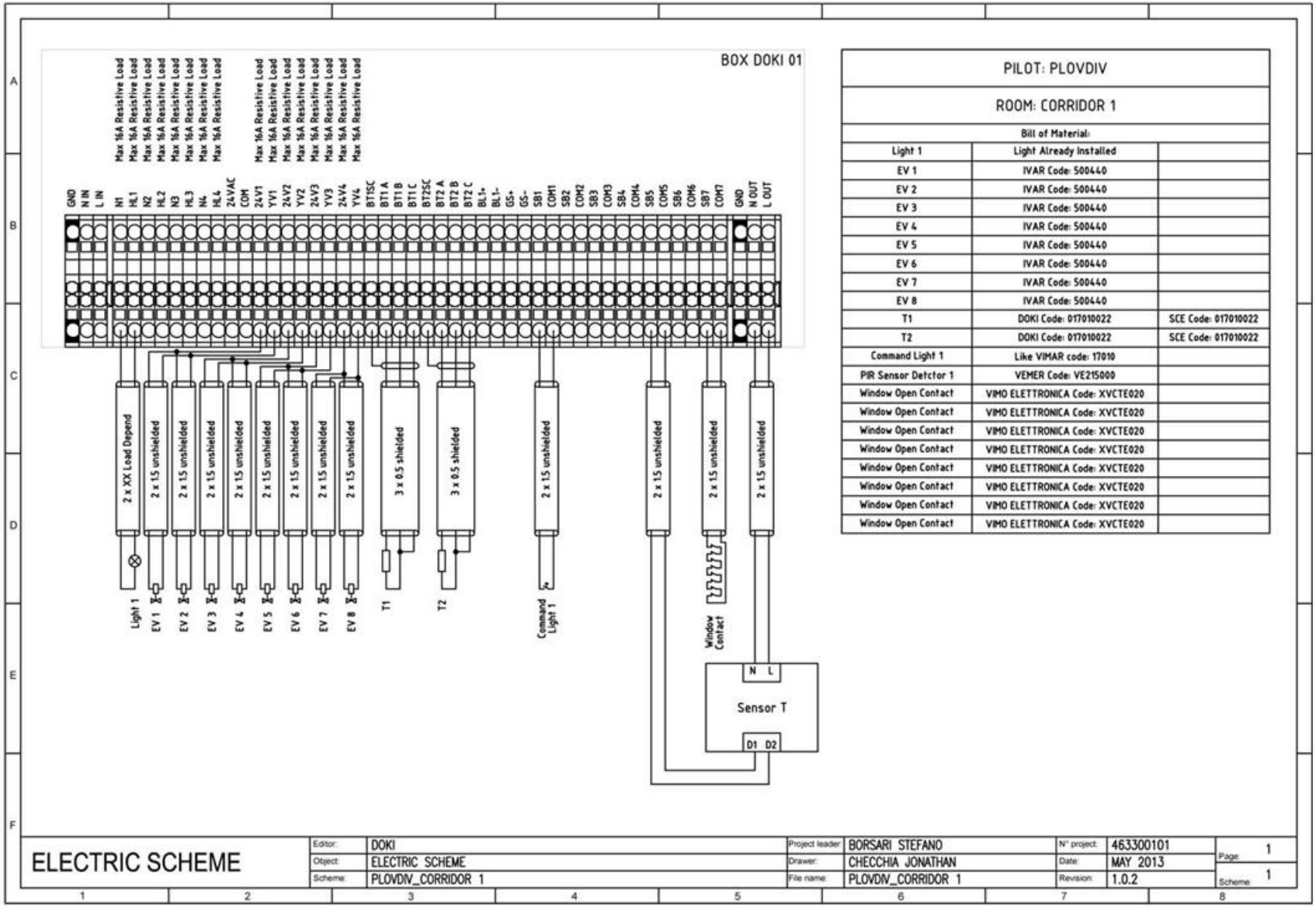


Figure 2-11: Wiring schema – Corridor 1

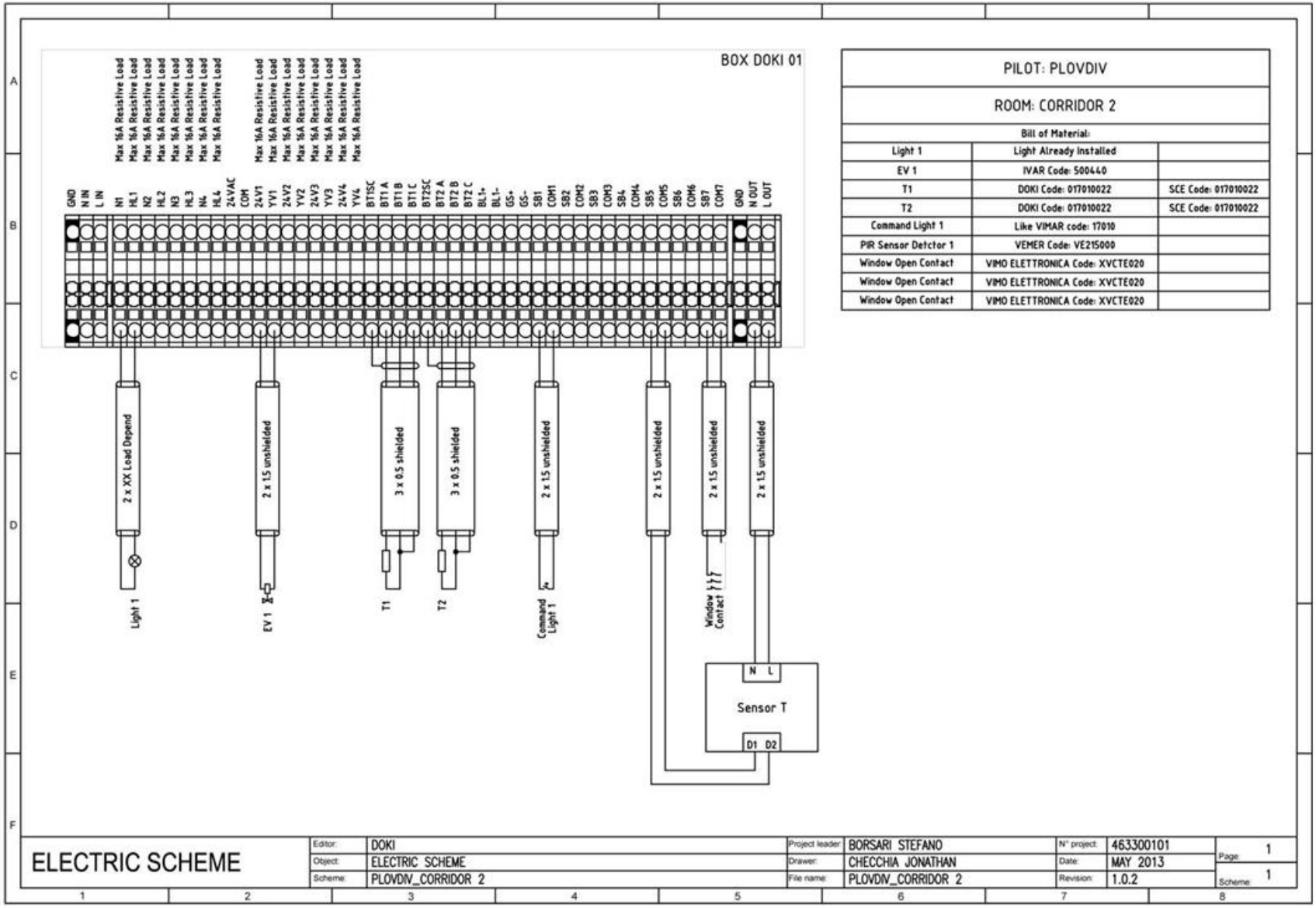


Figure 2-12: Wiring schema – Corridor 2

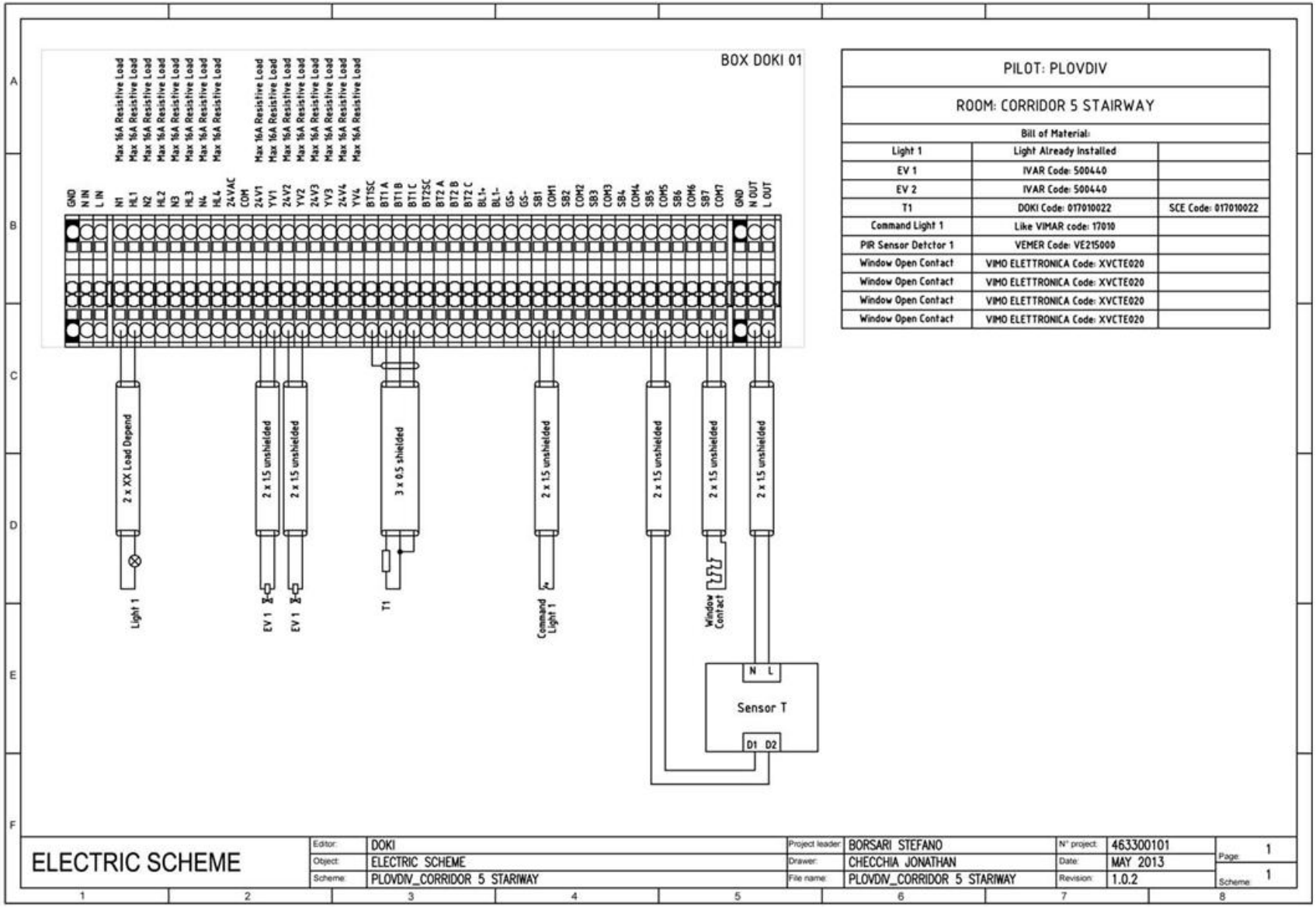


Figure 2-13: Wiring schema – Corridor 5 Stairway

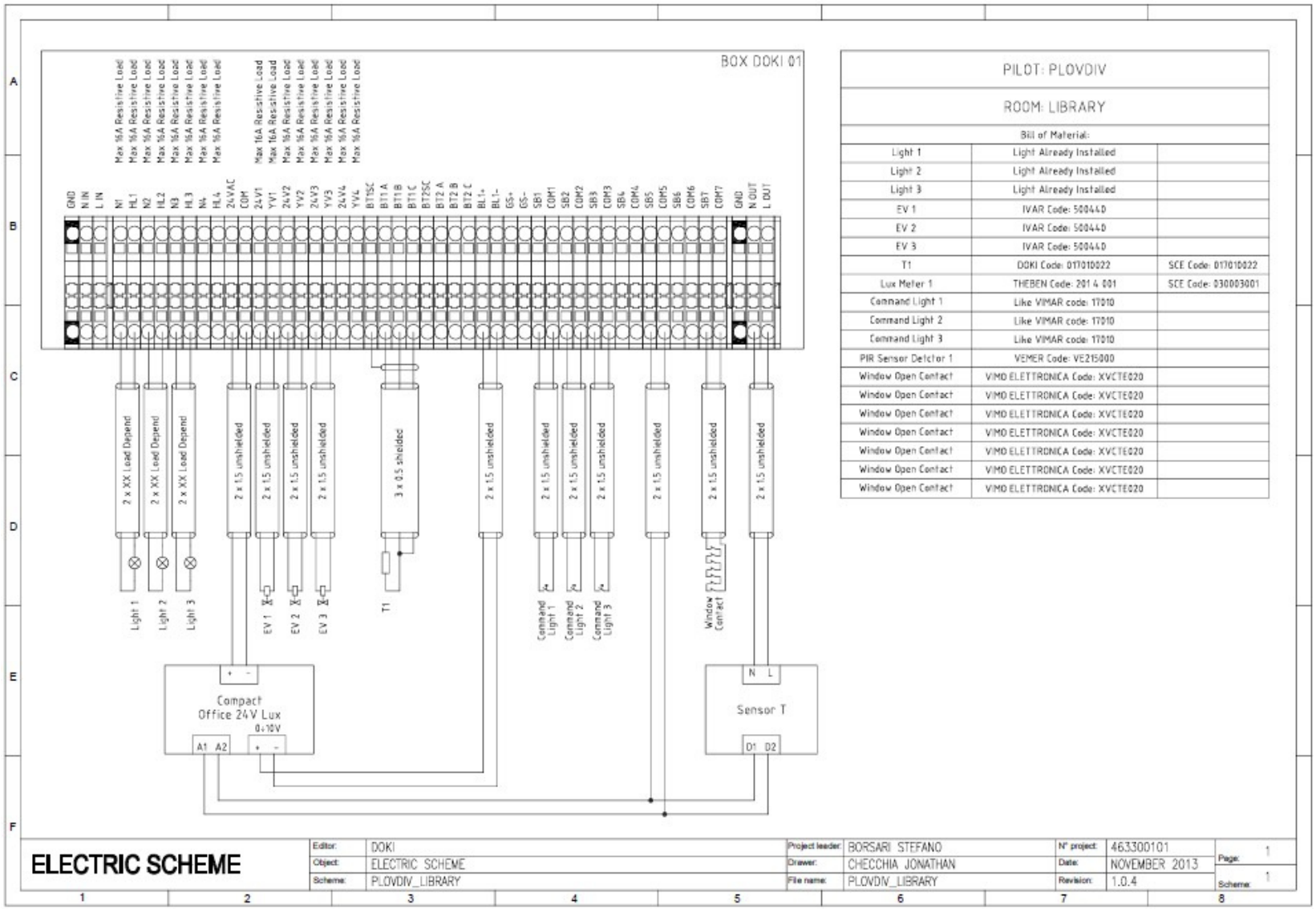


Figure 2-14: Wiring schema – Library

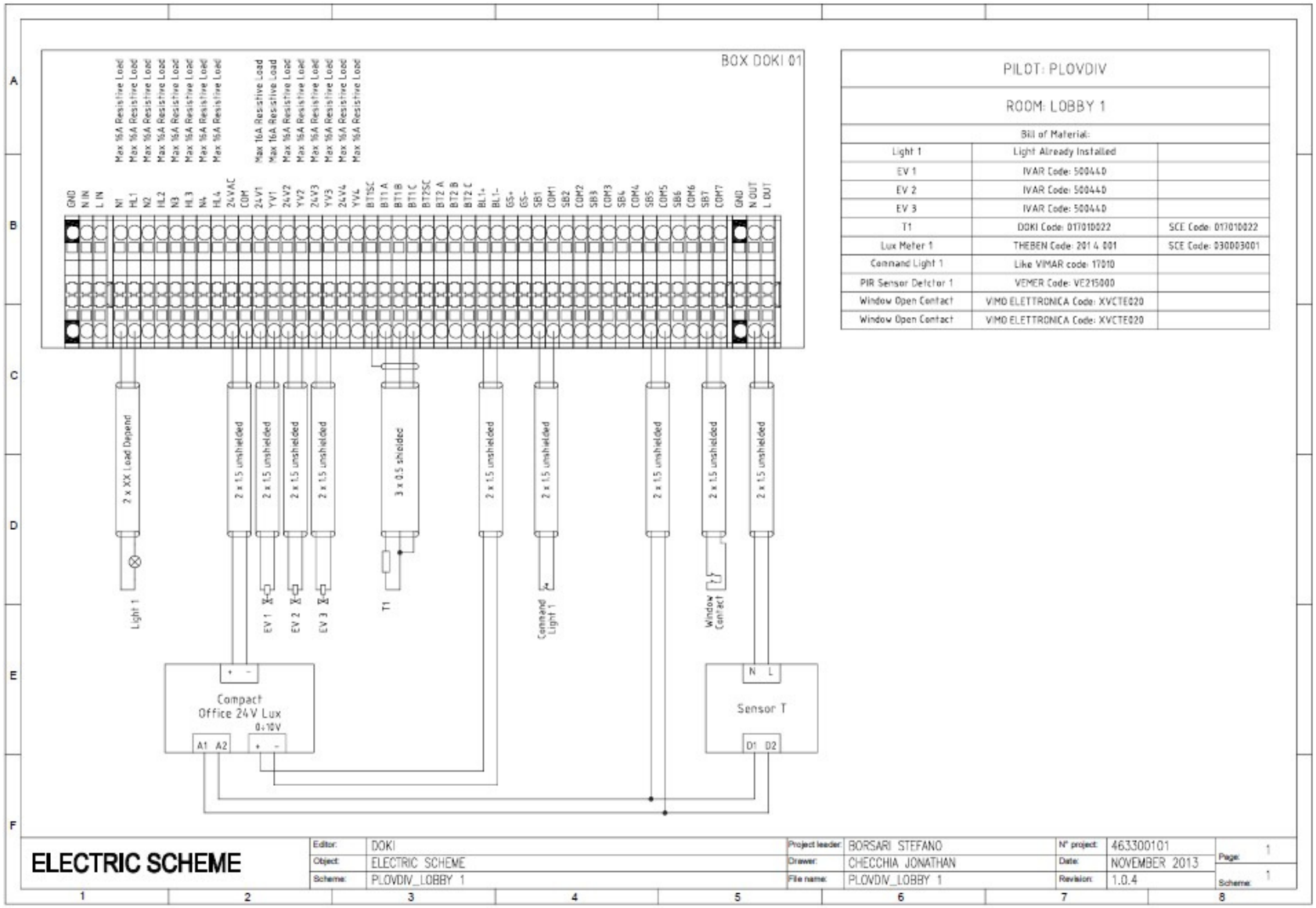


Figure 2-15: Wiring schema – Lobby #1

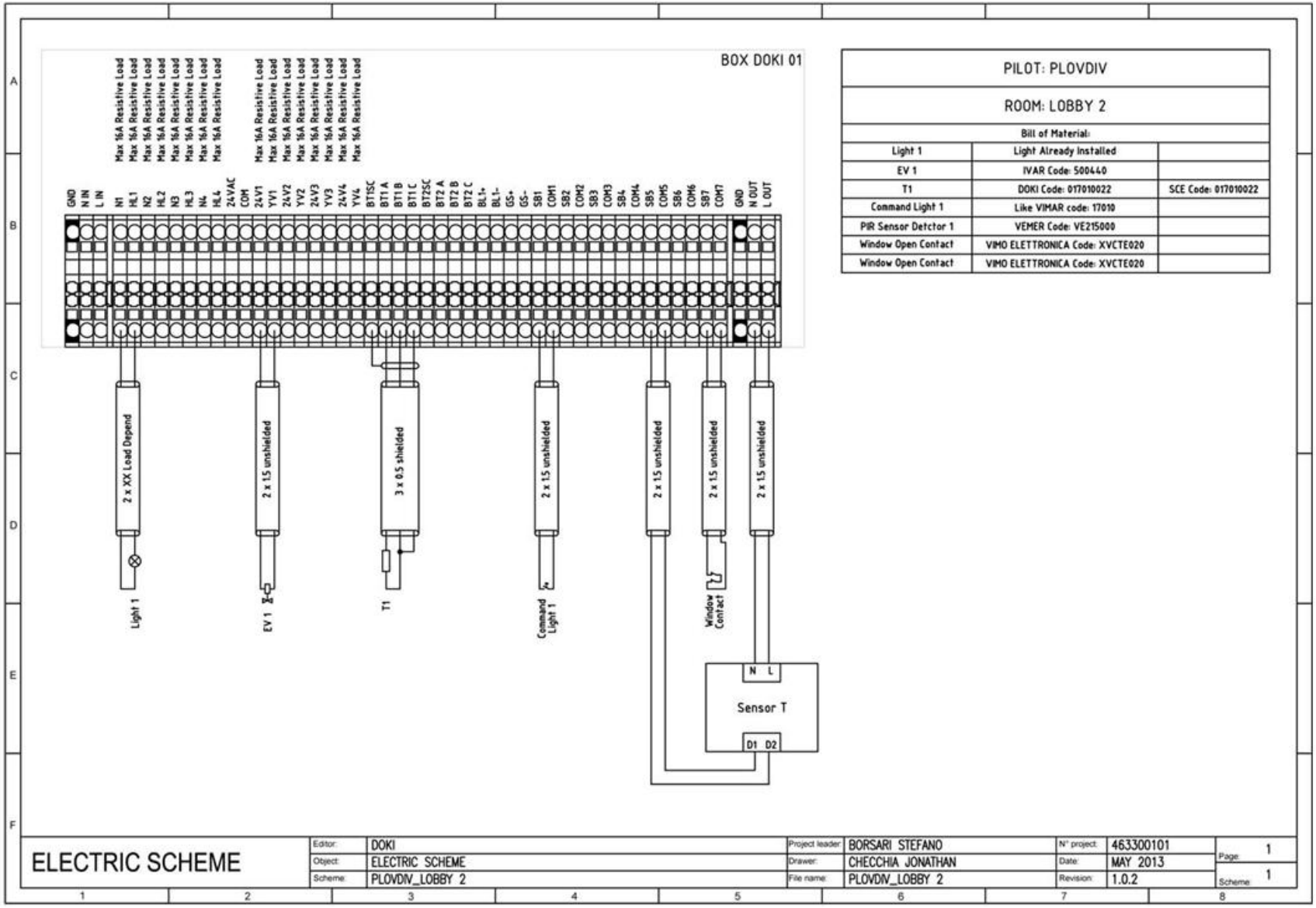


Figure 2-16: Wiring schema – Lobby #2

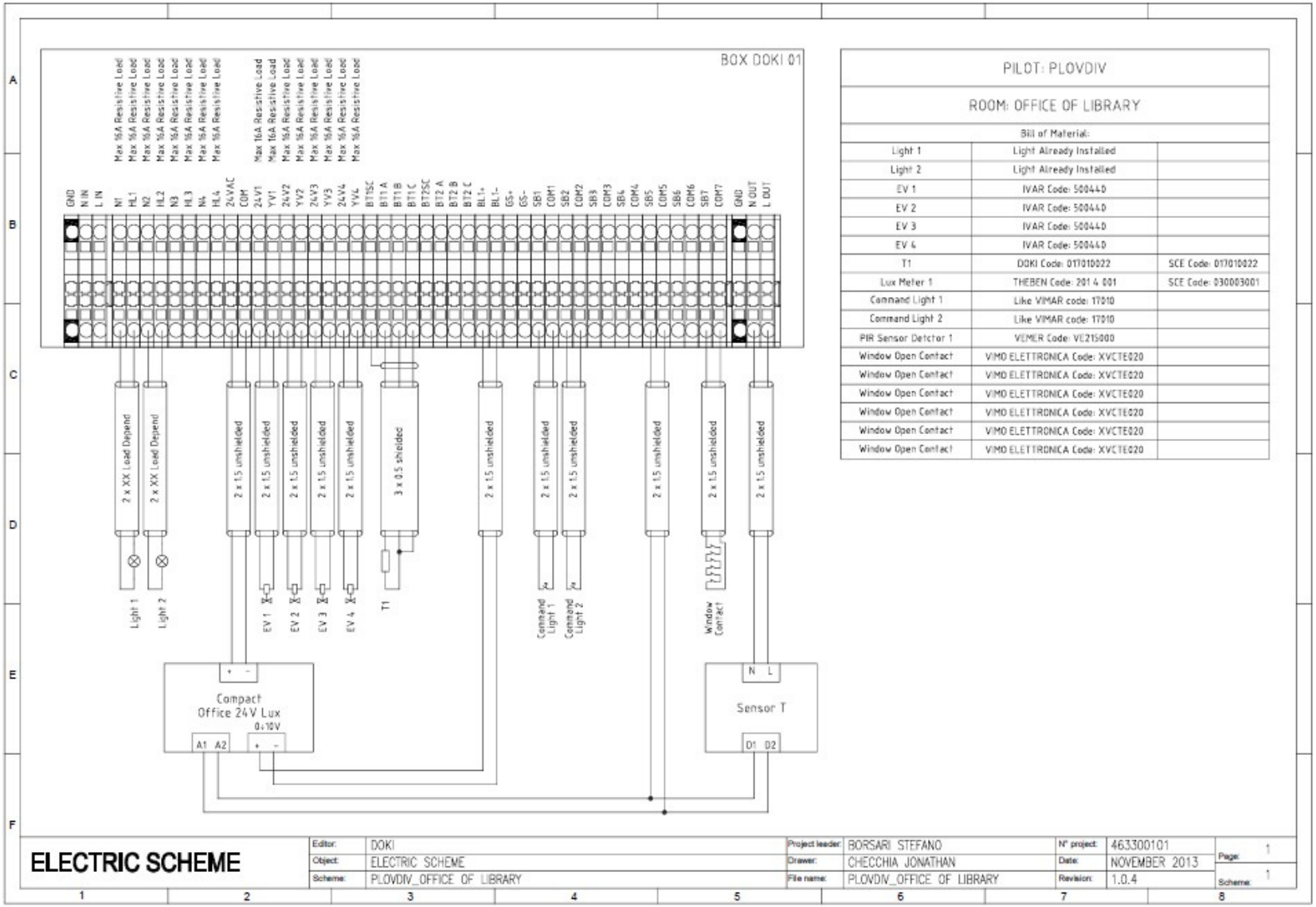


Figure 2-17: Wiring schema – Room Office of the Library

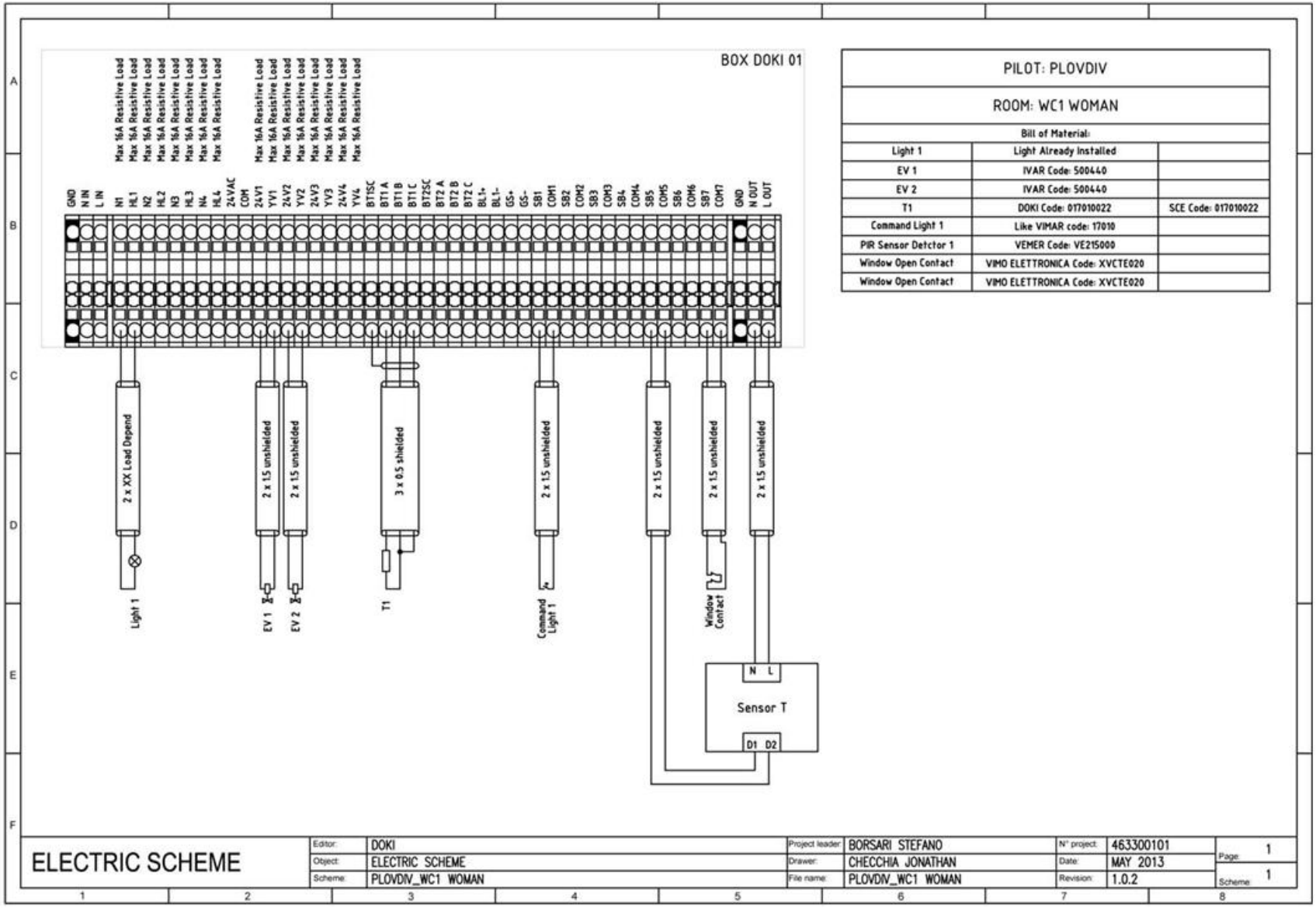


Figure 2-18: Wiring schema – WC #1 (Woman)

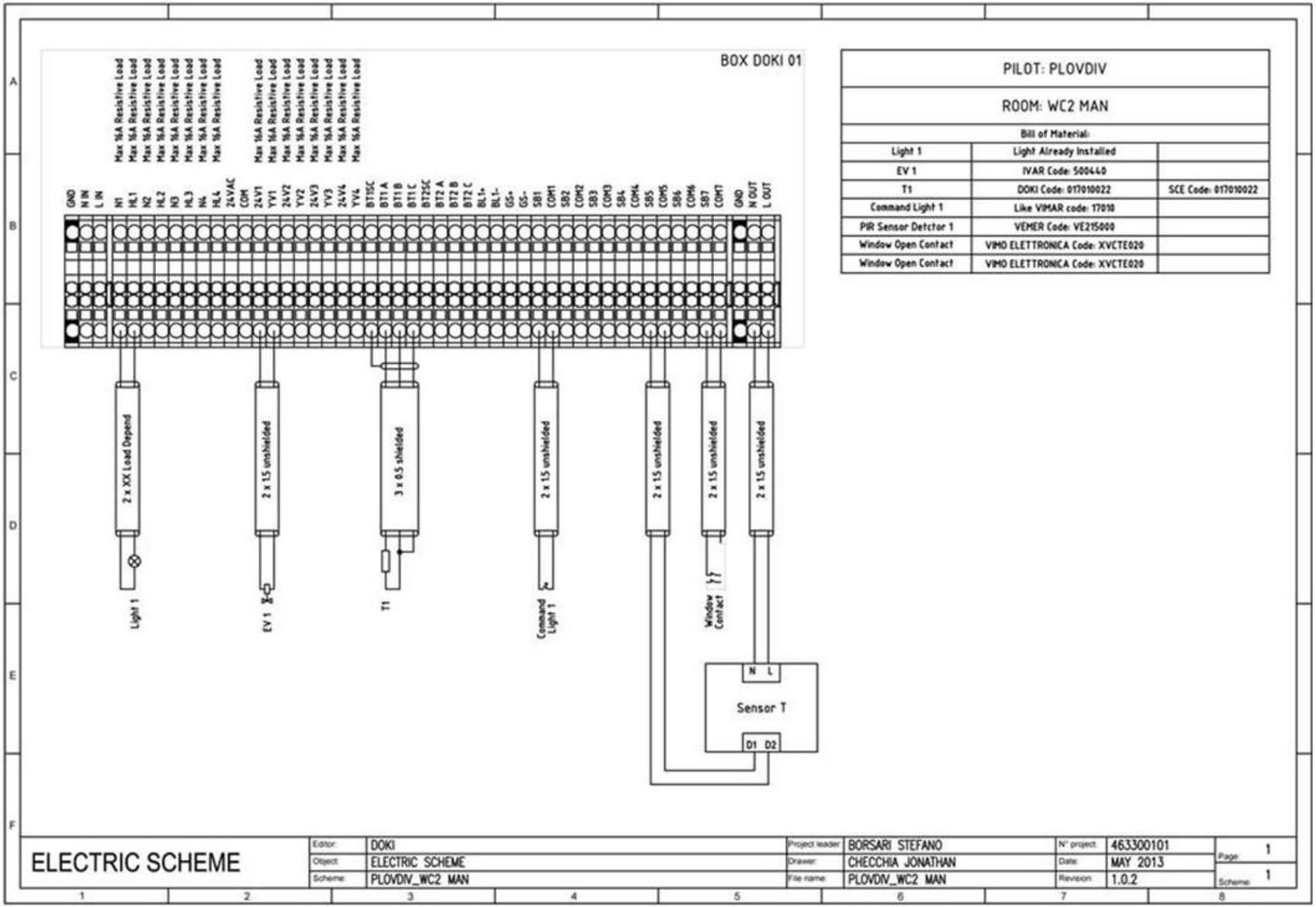


Figure 2-19: Wiring schema – WC #1 (Man)

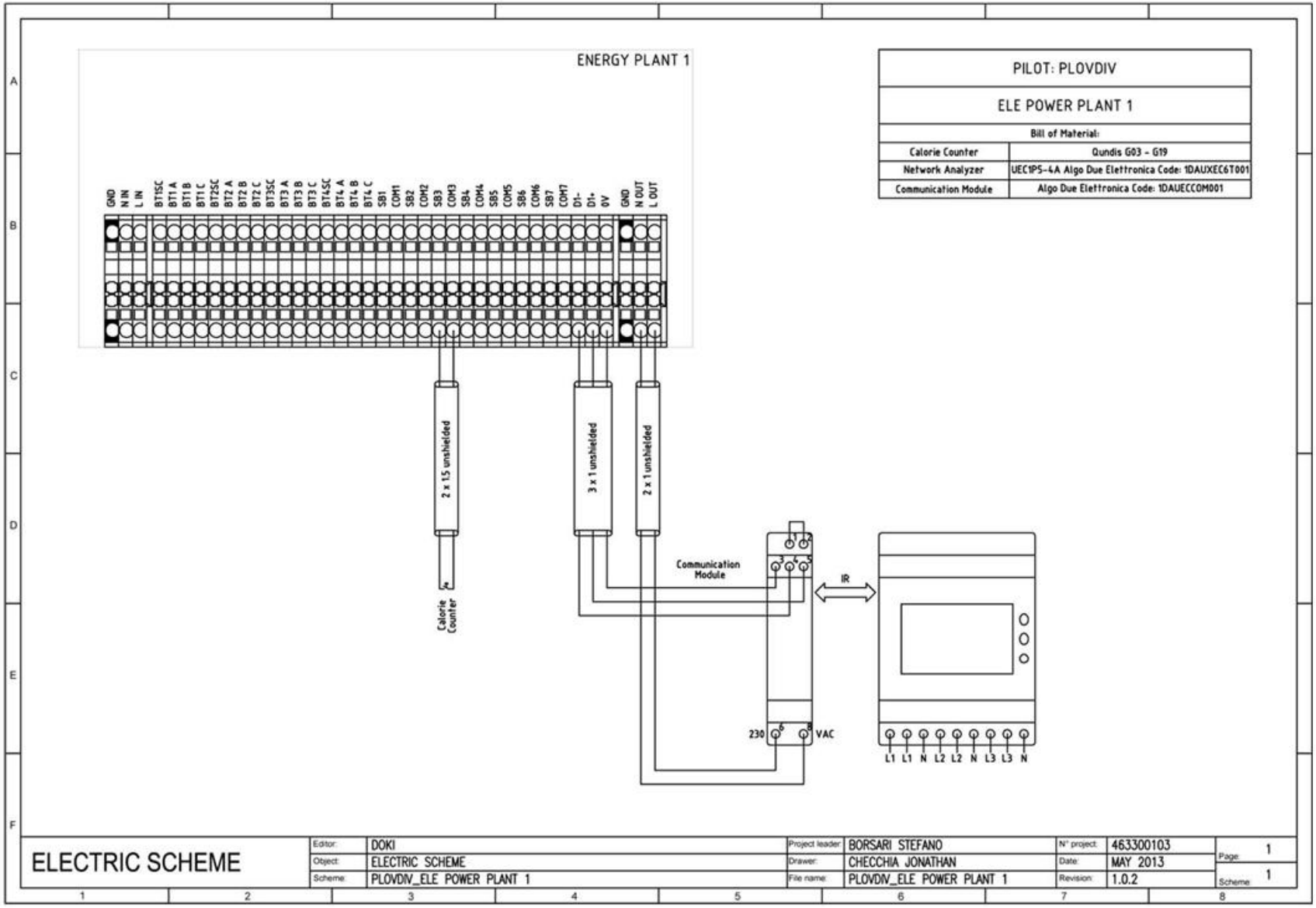


Figure 2-20: Wiring schema – ELE Power Plant #1

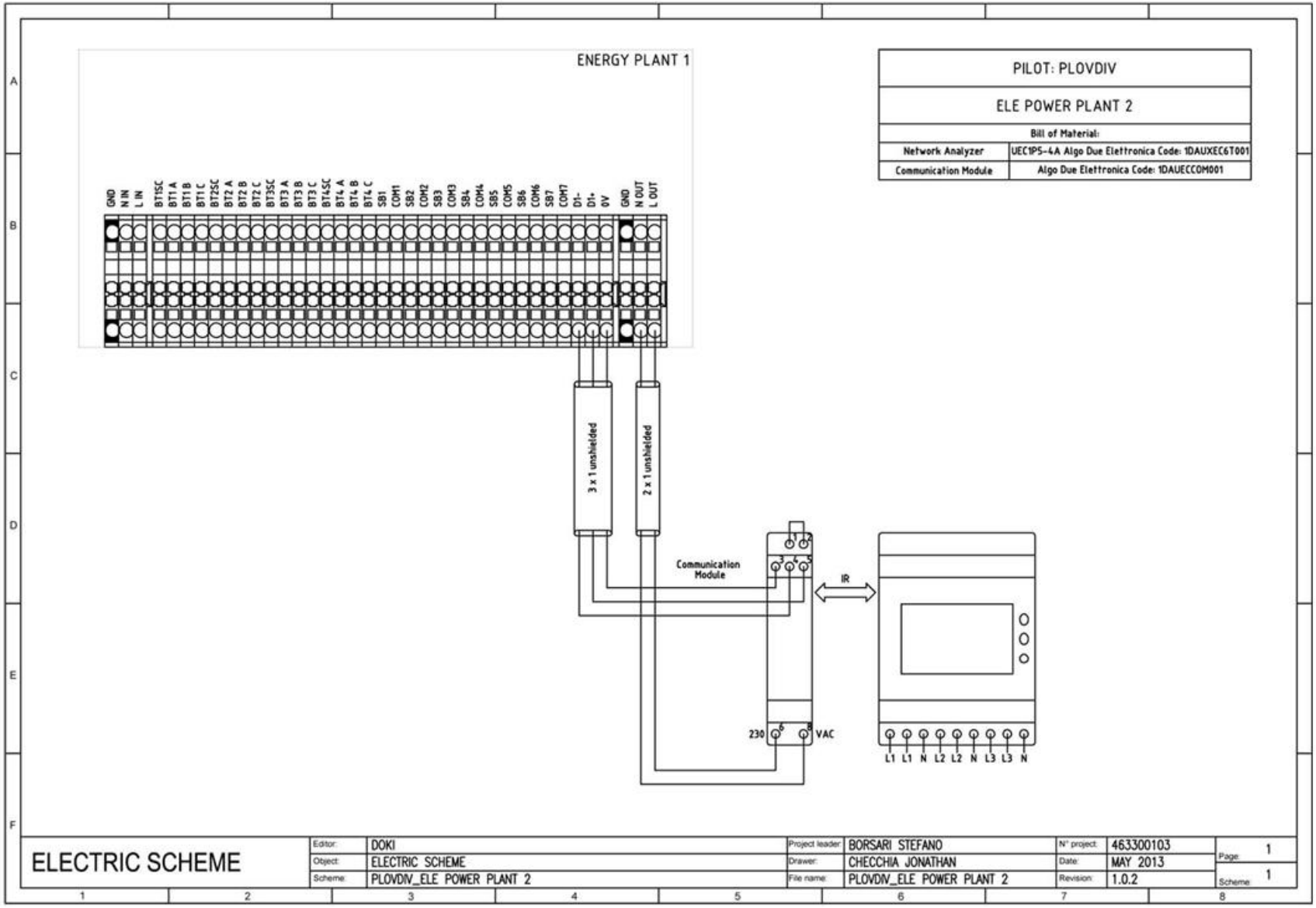


Figure 2-21: Wiring schema – ELE Power Plant #2

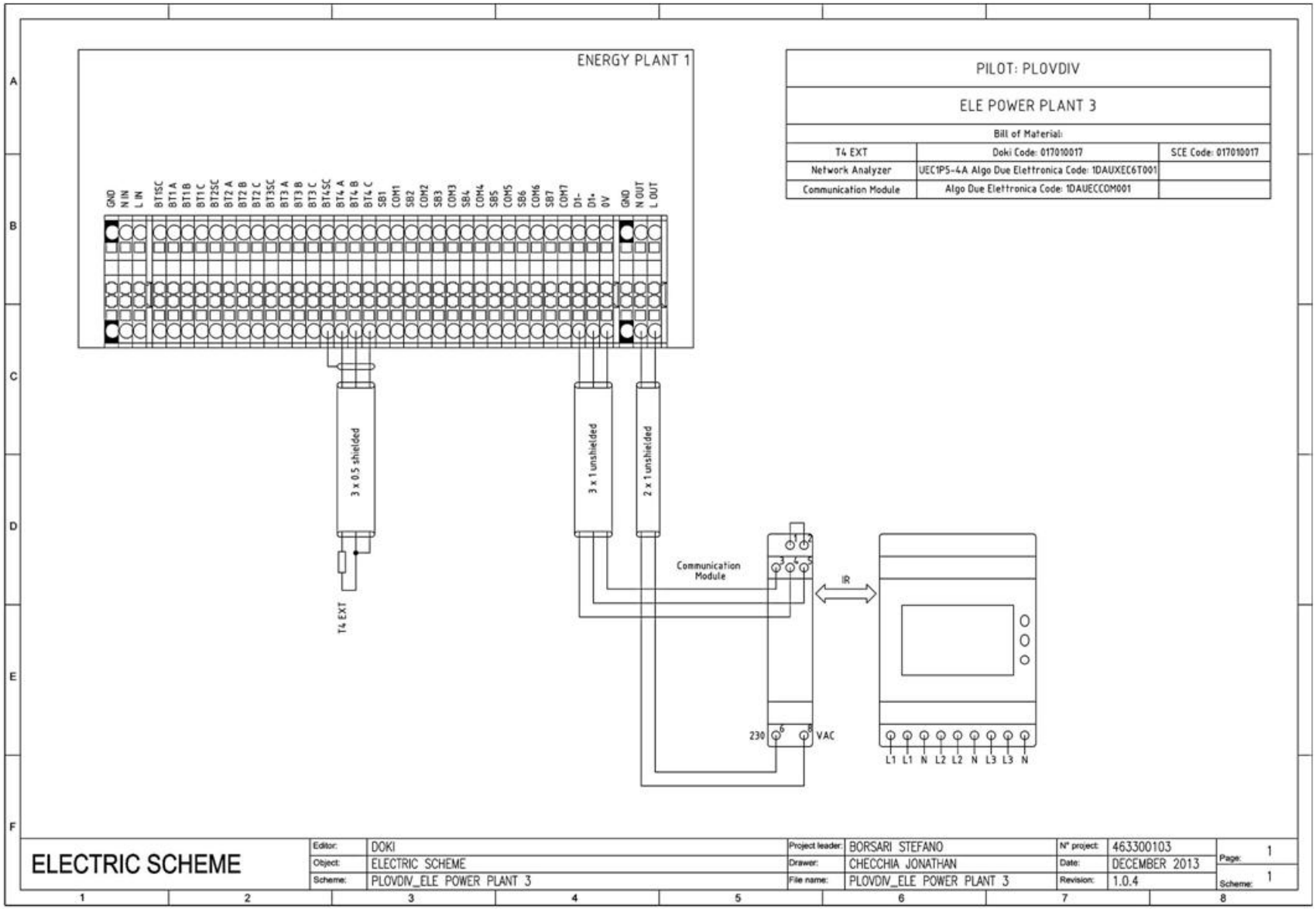


Figure 2-22: Wiring schema – ELE Power Plant #3

2.2 Specific points of the installation

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

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

1. BEMS was installed over rather ancient existing plants, although part of them are under renovations.
2. BEMS Installation was carried out following the very detailed set of documentation for the 3rd floor, comprehensive of the positions of valves, lights, sensors and windows prepared by Plovdiv staff.
3. The layout of the Pilot has been modified before installation, because the original proposal didn't not fit with the project budget allocated. The number of rooms was reduced with respect to the initially provided plan, but the decision taken in January 2013. This change compelled to reformulate the preparation of materials, the layouts, the firmware configuration of the EVO Modules and in general the preparation and the organization of the whole set of documentation (BEMS design) for installation and the equipment to be supplied.
4. The choice of using EVO Control Box Units, i.e. the same basic module for all the applications, helped in reducing interconnections and the installation itself, and in overcoming the difficulties of heavy last minute changes in the Pilot structure.
5. Installation was carried out with the help of local plants specialists.
6. Heating system is provided through a heat exchanger (substation) connect to the district heating network. Heat measuring was obtained with a Dunfoss ultrasonic device, selected with the objective of keeping the maximum adherence with existing devices. The smart meter is connected to the Control Unit labeled "BOX PLOV_ELE_POWER PLANT 1".

Figure 2-23: Installed Danfoss heat meter – SONOMETER 1100

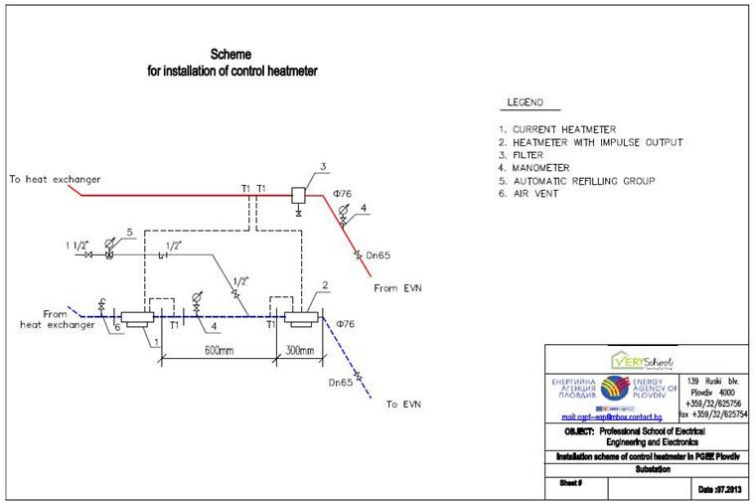


Figure 2-24: Installation scheme of control heat meter

7. Heating distribution system (radiators) was transformed using on-off valves on all radiators, valves are from the brand Dunfoss, as Plovdiv school already installed Dunfoss devices. The valves are controlled by thermal wax acturators, through 24V signal. To avoid unnecessary additional works and to ensure future seamlessly replacing of radiators without the need to drain the entire heating system, radiator reverse links have been mounted lockshield valves.

	PLOVDIV PILOT	DUNFOSS	Name	VALVE LIST
Pieces	Description	Type		DANFOSS CODE
13	straight valve 1/2"	iron/iron	RA-N 15	013G0014
13	straight holder 1/2"	iron/iron	RLV-15	003L0144
28	90° valve 1/2"	iron/iron	RA-N 15	013G0013
28	90° holder 1/2"	iron/iron	RLV-15	003L0143
2	90° valve 3/4"	iron/iron	RA-N 20	013G0015
2	90° holder 3/4"	iron/iron	RLV-20	003L0145
43	head		TWA-A, NC	088H3110

Figure 2-25: Table of installed valves in Plovdiv

Angle valve RA-N

Angle Lockshield valve RLV-15

Actuator TWA

Angle valve RA-N

Straight Lockshield valve RLV-15

Figure 2-26: Pictures of installed valves in Plovdiv

8. There are air conditioners in some rooms; nevertheless, also if EVO Modules have free input/output channels, no connection has been made according to the decision of the Pilot Leader.
9. The LED technology has been considered in two classrooms for replacing existing fluorescent lamps: both of them are equipped with a dimming control. Quality of installation was particularly satisfactory, as wiring was hidden in the ceiling avoiding external cabling.

Name	Dimentions	LED Power input	Temp.	contemporary fluorescent lamps equivalent	Count
Wall 3 D60.LDT	60см x60см	60 W	4000 K	2x58 W	17

Figure 2-27: Installed LED lamps in Lab.1307

10. The external temperature sensor has been located on the external frame of the first window in Corridor #1 and connected to the Control Box labeled “BOX PLOV_ELE_POWER PLANT 2”.

Figure 2-28: External temperature sensor installed on the exterior window of the Corridor 1

11. Three smart meter have been installed to get the electricity measurement: active and reactive power, active and rective energy, voltage and current for each of the 3 phases. This choice was to fit with the existing electricity network in the building which has 3 line supply.
    Two meters are for the Pilot area and one to measure for the whole building (school). At present, only one of two necessary electricity meters for whole building is installed in main distribution switchboard, located in room № 45, at the firtst floor. Second measuring instrument with a set of three current transformers will be installed after renovation of the new corpus.

    For measuring the electricity consumption in the Pilot have two meters are installed, respectively in the two floor sub distribution boards. One electricity meter mounted in Sub distribution board 1 measures consumptions of in Rooms: 1303, 1304, 1305, 1306, 1307, 1308, 1309; Corridor 1, Lobby 1, Lobby 2, and the electrical parameters for the area.

The second electricity meter is mounted in sub distribution board 2, located in Corridor5. It measures consumed energy from Corridor 5, Library and Library Office, and the electrical parameters for the area.

Figure 2-29: Installed smart electricity meter in Main distribution board 1

Figure 2-30: Installed smart electricity meter in Floor sub-distribution board 1

Figure 2-31: Installed smart electricity meter in Floor sub-distribution board 2

12. The remaining devices were left in place as spare parts.
13. Due to the selected area, there was no need of installing wireless devices.
14. The installed presence sensors type Finder, are movement detectors for transit areas. The producer adjustments were set that the lighting turned on every time when there is occupancy, independently the ambient lighting. This caused disapproving reaction of teachers and managers. It was decided to be installed new combined sensors (with presence and lux meters) the same as in 1307 and 1309 – type TheBens. The new lighting and presence sensors were installed in rooms: 1301, 1302, 1303, 1304, 1305, 1306, 1308, Library, Library office and Lobby 1. The set-point of brightness was determined for every room.

2.3 Summary of Installed BEMS equipment in Pilot:

Name	Description	Number
Temperature sensors	**internal Italcoppie**	**18**
	external Italcoppie IP67	**1**
Window contacts	**VIMO CTE020**	**52**
Presence detectors	**Finder 18.21-PIR**	**21**
Precense and Luxmeter	**TheBens**	**12**
LED lamps	**Wall 3 D60.LDT 60W (dimmerable)**	**17**
ON/OFF Valves+actuators	**Danfoss RA-N, TWA-A**	**43**
Electrical Meter	**UEC80-4X**	**3**
Thermal meter	**Danfoss Sonometer 1100**	**1**

Table 2.2-1: Summary of installed BEMS equipment in Plovdiv Pilot

Room/Premises	VERYSchool device /sensor	Units
Library	Presence sensor Finder	1
	presence and lux meter thebenHTS	1
	Window contact	1
	Temperature sensor PT1000	1
	ON/OFF valve + lockshield valve +actuator Danfoss	3
	Master EVO BOX 12	1
Lobby 1	Presence sensor Finder	1
	presence and lux meter thebenHTS	1
	Window contact	2
	Temperature sensor PT1000	1
	ON/OFF valve + lockshield valve +actuator Danfoss	3
	Master EVO BOX13	1
	LAN switcher	1
Corridor 5	Presence sensor Finder	1
	Window contact	1
	Temperature sensor PT1000	1
	ON/OFF valve + lockshield valve +actuator Danfoss	2
	Master EVO BOX 18	1
	Power Plant 3	1

Room/Premises	VERYSchool device /sensor	Units
Office of Library	Presence sensor Finder	1
	presence and lux meters thebenHTS	1
	Window contact	1
	Temperature sensor PT1000	1
	ON/OFF valve + lockshield valve +actuator Danfoss	4
	Master EVO BOX 15	1
Corridor 1	Presence sensor Finder	4
	Window contact	9
	Temperature sensor PT1000	1
	External temperature sensor	1
	ON/OFF valve + lockshield valve +actuator Danfoss	8
	Master EVO BOX 10	1
	Energy Pant 2	1
	LAN switchers	3
Computer laboratory 1301	Presence sensor Finder	1
	presence and lux meter thebenHTS	1
	Window contact	3
	Temperature sensor PT1000	1
	Master EVO BOX 1	1
	ON/OFF valve + lockshield valve +actuator Danfoss	2

Computer laboratory 1302	Presence sensor Finder	1
	presence and lux meter thebenHTS	1
	Window contact	3
	Temperature sensor PT1000	1
	ON/OFF valve + lockshield valve +actuator Danfoss	2
	Master EVO BOX 2	1
Class room 1304	Presence sensor Finder	1
	presence and lux meter thebenHTS	1
	Window contact	3
	Temperature sensor PT1000	1
	ON/OFF valve + lockshield valve +actuator Danfoss	2
	Master EVO BOX 4	1
Class room 1306	Presence sensor Finder	1
	presence and lux meter thebenHTS	1
	Window contact	3
	Temperature sensor PT1000	1
	ON/OFF valve + lockshield valve +actuator Danfoss	2
	Master EVO BOX 6	1
Laboratory 1307	presence and lux meter (24V Lux) with dimming	1
	Window contact	4
	Temperature sensor PT1000	1
	ON/OFF valve + lockshield valve +actuator Danfoss	4
	Master EVO BOX 7	1
Corridor 2	Presence sensor Finder	1
	Window contact	3
	Temperature sensor PT1000	1
	ON/OFF valve + lockshield valve +actuator Danfoss	1
	LAN switcher	1
	Master EVO BOX 11	1
WC Woman	Presence sensor Finder	1
	Window contact	2
	Temperature sensor PT1000	1
	ON/OFF valve + lockshield valve +actuator Danfoss	2
	Master EVO BOX	1
Class room 1303	Presence sensor Finder	1
	presence and lux meter thebenHTS	1
	Window contact	3
	Temperature sensor PT1000	2
	ON/OFF valve + lockshield valve +actuator Danfoss	2
	Master EVO BOX 3	1
Class room 1305	Presence sensor Finder	1
	presence and lux meter thebenHTS	1
	Window contact	3
	Temperature sensor PT1000	1
	ON/OFF valve + lockshield valve +actuator Danfoss	2
	Master EVO BOX 5	1
Class room 1308	Presence sensor Finder	1
	presence and lux meter thebenHTS	1
	Window contact	2
	Temperature sensor PT1000	1
	ON/OFF valve + lockshield valve +actuator Danfoss	1
	Master EVO BOX 8	1
Laboratory 1309	presence and lux meter (24V Lux) with dimming	1
	Window contact	6
	Temperature sensor PT1000	3
	ON/OFF valve + lockshield valve +actuator Danfoss	4
	Master EVO BOX 9	1
Lobby 2	Presence sensor Finder	1
	Window contact	1
	Temperature sensor PT1000	1
	ON/OFF valve + lockshield valve +actuator Danfoss	1
	Master EVO BOX 14	1
WC Man	Presence sensor Finder	1
	Window contact	2
	Temperature sensor PT1000	1
	ON/OFF valve + lockshield valve +actuator Danfoss	0
	Master EVO BOX	1

Table 2.2-1: Description of installed BEMS equipment in rooms

3. Web Remote Access to the SCADA PC DOME.

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

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

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

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

3.1 Web Access

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

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

3.1.1 How to get IP address

The first thing to do is getting the Pilot IP address following the procedure below. Type this address on your browser:

https://78.130.186.133:12081/cgi-bin/zscp?Section=CPAuth&Action=Show&ZSCPRedirect=78.130.186.133:::http://78.130.186.133:8135/%3f

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

The system will ask the user for a password:

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

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

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

User: doki

Password: dokidoki

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

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

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

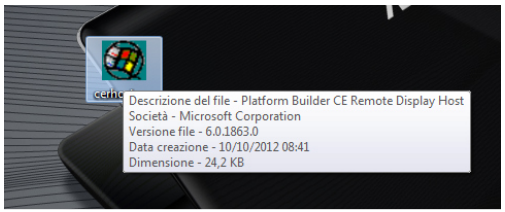
NOTE: This type of access depends on the installed PC. If the PC changes also the string to type might change.

3.1.2 Connection to the PC

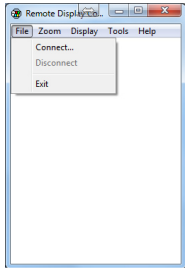
There are two ways to connect to the DOKI PC:

FIRST way: type this address in the browser: http:// http://78.130.186.133:5800. This web-based connection requires Java installation (if not already available on the PC, download it from: http://www.java.com/it/download/. It may be subject to fault network connection. (it is necessary to accept all windows security request in order to start the connection).

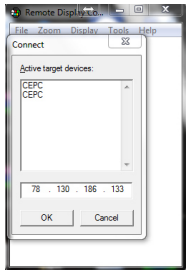
SECOND way: Start **Cherhost.exe** program



Choose “File” on the new windows.



Select “connect” and type this IP address: **78.130.186.113**

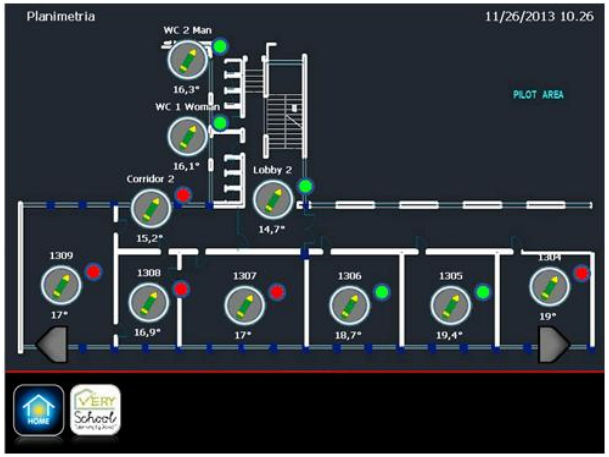


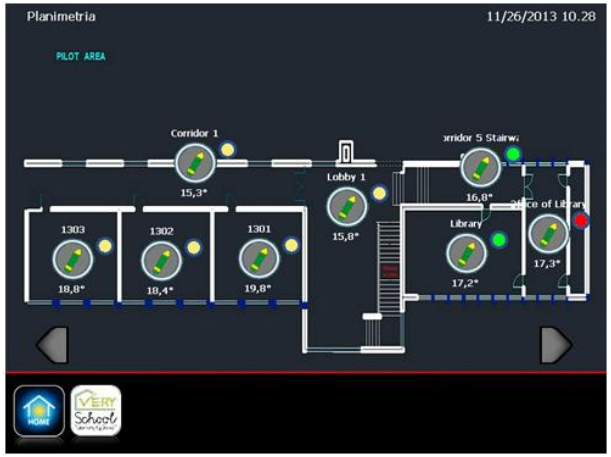
Select “OK”. In a few second the pc screen will come into view in a new windows

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

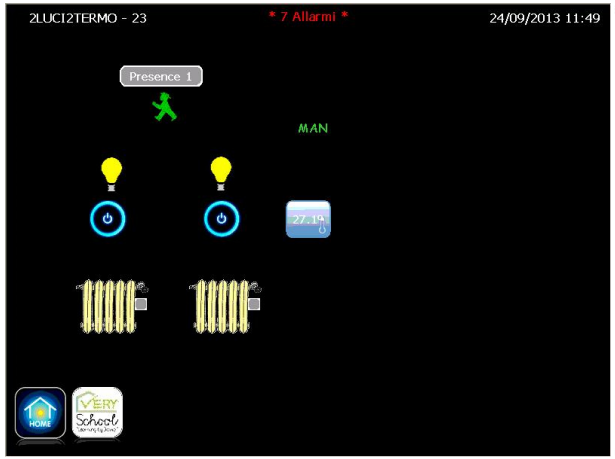
3.1.3 VerySchool key

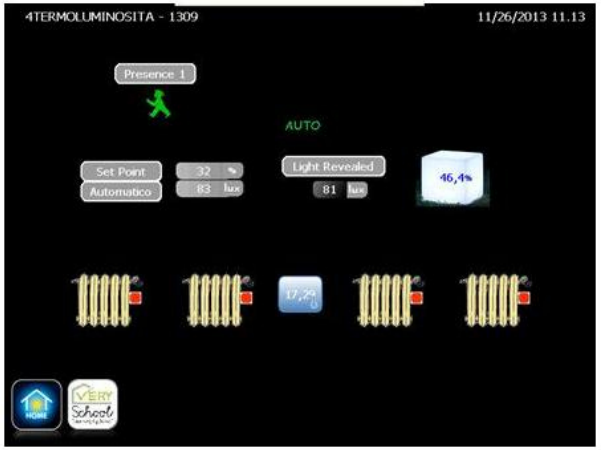
By taping the VeryScool key  (first key on the left part of the display) the Pilot layout will be shown and the user can access the lighting and temperature management menu. The arrow on the left and on the right allow to select restricted areas.





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





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

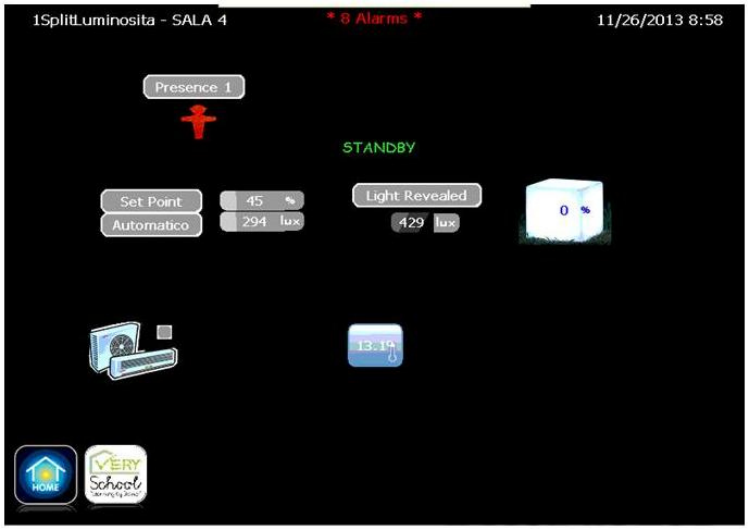
The presence sensor detects, symbol  , the room occupancy regime: green = occupancy; red = no presence.

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

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

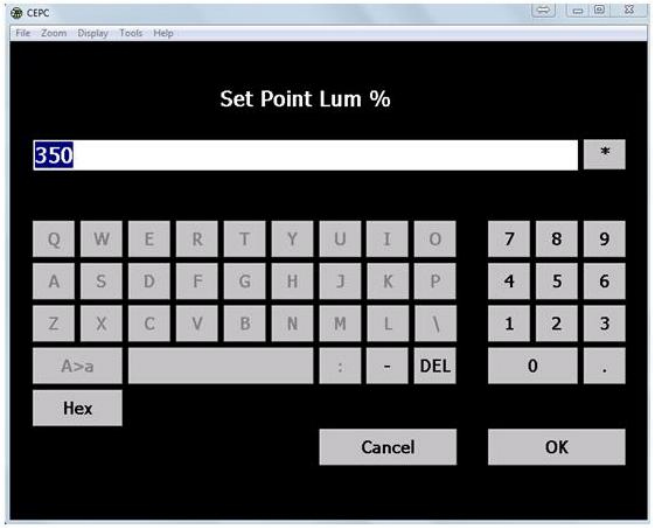
By clicing on the symbol it is possible to change the lighting status. This action, indeed, disables the automatic control (if BEMS is working on “Auto”)so it is suggested to use being aware of the consequence.

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



The value shown in percentage represents the set point of brightness, corresponding to the number expressed in lux : in the example above, 45% corresponds to 294 lux. Each sensor has a different default values since for each of them a calibration has been performed with lab tests.

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



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

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

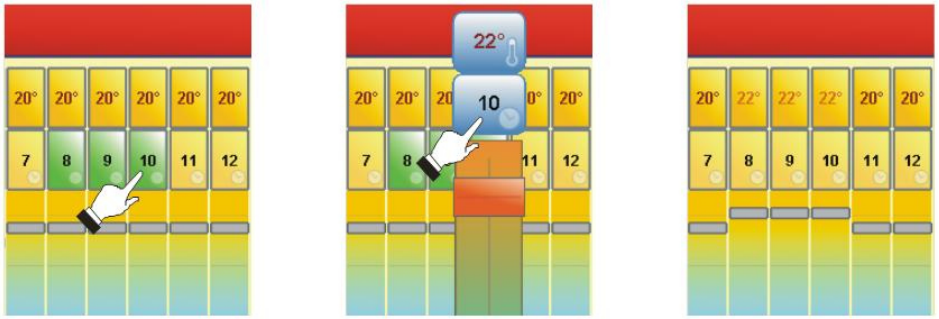
The number under the label "Light Revealed" 

is the real-time measurement [lux] within the classroom. The lightcube shows (view mode only), the percentage of lights dimming. This percentage is determined by the firmware on the basis of the automatic set point (e.g. 40% - 283 Lux), on the measured light (e.g.429 lux) and the presence (or absence) in the room.

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

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

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



To select the current season tap the following keys.

 Summer

 Winter

 OFF (Mid-season)

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

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

3.1.4 Consumption Key

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

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

List of variables should be actualized

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 #1301*	5	13	60	**78**	1	1	1	2	1	**1**		
	Class Room #1302	6	15	66	**87**	1	1	1	2	2	**1**		
	Class Room #1303	5	13	60	**78**	1	1	1	2	1	**1**		
	Class Room #1304	5	13	60	**78**	1	1	1	2	1	**1**		
	Class Room #1305	6	15	66	**87**	1	1	1	2	2	**1**		
	Class Room #1306	6	15	66	**87**	1	1	1	2	2	**1**		
	Class Room 1307 (with LED & dimming)	4	15	81	**100**	1	1	1	2	1	**1**		
	Class Room #1308	4	10	54	**68**	1	1	1	1	1	**1**		
	Class Room #1309 (with LED & dimming)	6	21	93	**120**	1	1	1	4	1	**1**		
Libraries	*Library*	8	20	78	**106**	1	1	1	3	3	**1**		
	Library #2 (Office)	8	21	78	**107**	1	1	1	4	2	**1**		
Entrance, Lobby, Corridors	*Corridor #1*	7	19	72	**98**	1	4	0	8	1	**4**		
	Corridor #2	4	10	54	**68**	1	1	0	1	1	**1**		
	Corridor #5 (Stairway, entrance to Library)	5	13	60	**78**	1	1	0	2	1	**1**		
	Lobby #1	6	16	66	**88**	1	1	1	3	1	**1**		
	Lobby #2	4	10	54	**68**	1	1	0	1	1	**1**		
Bath Rooms	*WC #1 (Woman)*	5	13	60	**78**	1	1	0	2	1	**1**		
	WC #2 (Men)	4	10	54	**68**	1	1	0	0	1	**1**		
General	*Meteo data*	0	1	6	**7**	1	0	0	0	0	**0**		
	School: Electrical and Thermal Networks	1	10	36	**47**							1	1
	Pilot: Electrical Measurement #1	0	10	57	**77**							1	
	Pilot: Electrical Measurement #2	0	10									1	
TOTAL		**99**	**293**	**1.281**	**1.673**	**19**	**21**	**12**	**43**	**24**	**21**	**3**	**1**

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

	Label	Class Room #1301	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.11 - Data received by DOKI - Data Transmission = 5 minutes.
1	PVCL001ALILIFLUC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	PVCL001ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour.
3	PVCL001ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative for the installation.
4	PVCL001OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	PVCL001ATIROOTEM01	Room Temperature	°C		1		1	
6	PVCL001ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
7	PVCL001RADMINVEC01	Radiator 1: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
8	PVCL001RADMINVAM01	Radiator 1: Minutes ON	minutes		1		1	Cumulative in the hour
9	PVCL001RADHOUVAM01	Radiator 1: Hours ON	hours		1		1	Cumulative from the installation
10	PVCL001RADMINVEC02	Radiator 2: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
11	PVCL001RADMINVAM02	Radiator 2: Minutes ON	minutes		1		1	Cumulative in the hour
12	PVCL001RADHOUVAM02	Radiator 2: Hours ON	hours		1		1	Cumulative from the installation
13	PVCL001RADPIDORC01	Radiators: Control signal	%		1		1	**PID < 33% R1 & R2 = OFF; 34% < PID < 66% R1 = ON & R2 = OFF; PID > 66% R1 & R2 ON**
14	PVCL001WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
15	PVCL001OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic**; **1 = manual**; **2 = stand-by**.
16	PVCL001RADTHRADS01	Threshold Radiator 1	%		1		1	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
17	PVCL001RADTHRADS02	Threshold Radiator 2	%		1		1	Set-Point to switch ON/OFF Valve 2. **used by IES only to calibrate the building model**
18	PVCL001ALIWAITIT01	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	PVCL001ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **PVCL001ALIMINLIM01** in the specific time interval
2	PVCL001ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **PVCL001ATIROOTEM01** in the specific time interval
3	PVCL001ATISPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **PVCL001ATIROOTES01** in the specific time interval.
4	PVCL001OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	Averaged value [Number of events **PVCL001OCCPRESEM01>0**] *** 5 [minutes]**,
5	PVCL001RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	3	ABS (last value - first value) of **PVCL001RADMINVAM01** in the specific time interval
6	PVCL001RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	3	ABS (last value - first value) of **PVCL001RADMINVAM02** in the specific time interval
7	PVCL001WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **PVCL001WINWIOPEM01 > 0**] *** 5 [minutes]**, in the specific time interval
8	PVCL001ALIERGCOH01	Room Lighting Energy Consumption	kWh	1	1	1		**[PVCL301ALIMINLIH01 * TotalWatt]/1000; TotalWatt = (18 x 40W) = 720 [Watt]**
9	PVCL001THCENRGYH01	Room Thermal Energy Consumption	kWh	1	1	1		**[(PVCL301RADMINVAM01 + PVCL301RADMINVAM02) * N.Power]/1000; N.Power = 1661 [Watt]**
10	PVCL001ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		**[PVCL301ATIROOTEM01>PVCL301ATIROOTEM01]** AND **[PVCL301RADMINVAH0x>0]**, x = 1, 2
11	PVCL001WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[PVCL301WINWIOPEH01>0 AND (PVCL301RADMINVAH01>0 OR PVCL301RADMINVAH02>0)]**
12	PVCL001OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		**[PVCL301OCCROWOWM01 <> 0]** in the specific time interval
13	PVCL001ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[PVCL301ALIMINLIH01>0 AND PVCL301OCCPRESEH01=0]**
14	PVCL001THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
15	PVCL001THCLTHSOH01	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 4-2: Room 1301 - physical measurement and HQDS variables.

	Label	Class Room #1302	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.12 - Data received by DOKI - Data Transmission = 5 minutes.
1	PVCL002ALILIFLUC01	Lighting: Status Circuit 1	ON/OFF	1			**1**	0 = OFF; 1 = ON. type fluorescent
2	PVCL002ALIMINLIM01	Lighting: Minutes ON Circuit 1	minutes		1		**1**	Cumulative in the hour
3	PVCL002ALIHOULIM01	Lighting: Hours ON Circuit 1	hours		1		**1**	Cumulative from the installation
4	PVCL002ALILIFLUC02	Lighting: Status Circuit 2	ON/OFF	1			**1**	0 = OFF; 1 = ON. type fluorescent
5	PVCL002ALIMINLIM02	Lighting: Minutes ON Circuit 2	minutes		1		**1**	Cumulative in the hour
6	PVCL002ALIHOULIM02	Lighting: Hours ON Circuit 2	hours		1		**1**	Cumulative from the installation
7	PVCL002OCCPRESEM01	Presence Sensor	yes / no	1			**1**	0 = NO; 1 = YES
8	PVCL002ATIROOTEM01	Room Temperature	°C		1		**1**	
9	PVCL002ATIROOTES01	Set-Point Room Temperature	°C		1		**1**	Current Set-Point of the Room Temperature
10	PVCL002RADMINVEC01	Radiator 1: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON
11	PVCL002RADMINVAM01	Radiator 1: Minutes ON	minutes		1		**1**	Cumulative in the hour
12	PVCL002RADHOUVAM01	Radiator 1: Hours ON	hours		1		**1**	Cumulative from the installation
13	PVCL002RADMINVEC02	Radiator 2: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON
14	PVCL002RADMINVAM02	Radiator 2: Minutes ON	minutes		1		**1**	Cumulative in the hour
15	PVCL002RADHOUVAM02	Radiator 2: Hours ON	hours		1		**1**	Cumulative from the installation
16	PVCL002RADPIDORC01	Radiators: Control signal	%		1		**1**	**PID < 33% R1 & R2 = OFF; 34% < PID < 66% R1 = ON & R2 = OFF; PID > 66% R1 & R2 ON**
17	PVCL002WINWIOPEM01	Windows: status	close/open	1			**1**	0 = Windows CLOSED; 1 = Windows OPENED
18	PVCL002OCCROWOWM01	Room Control Status	-		1		**1**	**0 = automatic**; **1 = manual**; **2 = stand-by**.
19	PVCL002RADTHRADS01	Threshold Radiator 1	%		1		**1**	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
20	PVCL002RADTHRADS02	Threshold Radiator 2	%		1		**1**	Set-Point to switch ON/OFF Valve 2. **used by IES only to calibrate the building model**
21	PVCL002ALIWAITIT01	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 (Calculated Variables)			15'	hour	Day	QI	
1	PVCL002ALIMINLIH01	Lighting: Minutes ON Circuit 1	minutes	1	1	1	3	ABS (last value - first value) of **PVCL002ALIMINLIM01** in the specific time interval
2	PVCL002ALIMINLIH02	Lighting: Minutes ON Circuit 2	minutes	1	1	1	3	ABS (last value - first value) of **PVCL002ALIMINLIM02** in the specific time interval
3	PVCL002ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **PVCL002ATIROOTEM01** in the specific time interval
4	PVCL003ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **PVCL002ATIROOTES01** in the specific time interval.
5	PVCL002OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	Averaged value [Number of events **PVCL002OCCPRESEM01>0**] *** 5 [minutes]**
6	PVCL002RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	3	ABS (last value - first value) of **PVCL002RADMINVAM01** in the specific time interval
7	PVCL002RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	3	ABS (last value - first value) of **PVCL002RADMINVAM02** in the specific time interval
8	PVCL002WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **PVCL002WINWIOPEM01 > 0**] *** 5 [minutes]**
9	PVCL002ALIERGCOH01	Room Lighting Energy Consumption	kWh	1	1	1		**Circuit1 = [PVCL002ALIMINLIH01 * TotalW_C1]/1000; TotalW_C1=(4x3x40W) = 480 [Watt]** **Circuit2 = [PVCL002ALIMINLIH02 * TotalW_C2]/1000; TotalW_C2=(3x3x40W) = 360 [Watt]**
10	PVCL002THCENRGYH01	Room Thermal Energy Consumption	kWh	1	1	1		**[(PVCL002RADMINVAM01 + PVCL002RADMINVAM02) * N.Power]/1000; N.Powe =1661 [W]**
11	PVCL002ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		[**PVCL002ATIROOTEM01>PVCL002ATIROOTEM01**] AND [**PVCL002RADMINVAH0x>0**], x=1, 2
12	PVCL002WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**PVCL002WINWIOPEH01>0] AND [PVCL002RADMINVAH0x>0**], x=1, 2
13	PVCL002OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**PVCL002OCCROWOWM01 <> 0**] in the specific time interval
14	PVCL002ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[(**PVCL002ALIMINLIH01>0** OR **PVCL002ALIMINLIH02>0**) AND **PVCL002OCCPRESEH01=0**]
15	PVCL002THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
16	PVCL002THCLTHSOH01	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 4-3: Room 1302 - physical measurement and HQDS variables.

	Label	Class Room #1303	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.13 - Data received by DOKI - Data Transmission = 5 minutes.
1	PVCL003ALILIFLUC01	Lighting: Status	ON/OFF	1			**1**	0 = OFF; 1 = ON. type fluorescent
2	PVCL003ALIMINLIM01	Lighting: Minutes ON	minutes		1		**1**	Cumulative in the hour.
3	PVCL003ALIHOULIM01	Lighting: Hours ON	hours		1		**1**	Cumulative for the installation.
4	PVCL003OCCPRESEM01	Presence Sensor	yes / no	1			**1**	0 = NO; 1 = YES
5	PVCL003ATIROOTEM01	Room Temperature	°C		1		**1**	
6	PVCL003ATIROOTES01	Set-Point Room Temperature	°C		1		**1**	Current Set-Point of the Room Temperature
7	PVCL003RADMINVEC01	Radiator 1: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON
8	PVCL003RADMINVAM01	Radiator 1: Minutes ON	minutes		1		**1**	Cumulative in the hour
9	PVCL003RADHOUVAM01	Radiator 1: Hours ON	hours		1		**1**	Cumulative from the installation
10	PVCL003RADMINVEC02	Radiator 2: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON
11	PVCL003RADMINVAM02	Radiator 2: Minutes ON	minutes		1		**1**	Cumulative in the hour
12	PVCL003RADHOUVAM02	Radiator 2: Hours ON	hours		1		**1**	Cumulative from the installation
13	PVCL003RADPIDORC01	Radiators: Control signal	%		1		**1**	**PID < 33% R1 & R2 = OFF; 34% < PID < 66% R1 = ON & R2 = OFF; PID > 66% R1 & R2 ON**
14	PVCL003WINWIOPEM01	Windows: status	close/open	1			**1**	0 = Windows CLOSED; 1 = Windows OPENED
15	PVCL003OCCROWOWM01	Room Control Status	-		1		**1**	**0 = automatic**; **1 = manual**; **2 = stand-by**.
16	PVCL003RADTHRADS01	Threshold Radiator 1	%		1		**1**	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
17	PVCL003RADTHRADS02	Threshold Radiator 2	%		1		**1**	Set-Point to switch ON/OFF Valve 2. **used by IES only to calibrate the building model**
18	PVCL003ALIWAITIT01	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	PVCL003ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	**3**	ABS (last value - first value) of **PVCL003ALIMINLIM01** in the specific time interval
2	PVCL003ATIROOTEH01	Room Temperature	°C	1	1	1	**3**	Average among all value of **PVCL003ATIROOTEM01** in the specific time interval
3	PVCL003ATSPTEMH01	Set-Point Room Temperature	°C	1	1		**2**	Last value of **PVCL003ATIROOTES01** in the specific time interval.
4	PVCL003OCCPRESEH01	Presence Sensor	minutes	1	1	1	**3**	Averaged value [Number of events **PVCL003OCCPRESEM01>0**] *** 5 [minutes]**
5	PVCL003RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	**3**	ABS (last value - first value) of **PVCL003RADMINVAM01** in the specific time interval
6	PVCL003RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	**3**	ABS (last value - first value) of **PVCL003RADMINVAM02** in the specific time interval
7	PVCL003WINWIOPEH01	Windows Opened	minutes	1	1	1	**3**	[Number of events that **PVCL003WINWIOPEM01 > 0**] *** 5 [minutes]**
8	PVCL003ALIERGCOH01	Room Lighting Energy Consumption	kWh	1	1	1		**[LECL003ALIMINLIH01 * TotalWatt]/1000; TotalWatt = 580 [Watt]**
9	PVCL003THCENRGYH01	Room Thermal Energy Consumption	kWh	1	1	1		**[(PVCL003RADMINVAM01 + PVCL003RADMINVAM02) * N.Power]/1000; N.Power=1661 [W]**
10	PVCL003ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		[**PVCL003ATIROOTEM01>PVCL003ATIROOTEM01**] AND [**PVCL003RADMINVAH01>0 OR PVCL003RADMINVAH02>0**]
11	PVCL003WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**PVCL003WINWIOPEH01>0 AND (PVCL003RADMINVAH01>0 OR PVCL003RADMINVAH02>0)**]
12	PVCL003OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**PVCL003OCCROWOWM01 <> 0**] in the specific time interval
13	PVCL003ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[**PVCL003ALIMINLIH01>0** AND **PVCL003OCCPRESEH01=0**] in the specific time interval
14	PVCL003THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
15	PVCL003THCLTHSOH01	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 4-4: Room 1303 - physical measurement and HQDS variables.

	Label	Class Room #1304	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.14 - Data received by DOKI - Data Transmission = 5 minutes.
1	PVCL004ALILIFLUC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	PVCL004ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour.
3	PVCL004ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative for the installation.
4	PVCL004OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	PVCL004ATIROOTEM01	Room Temperature	°C		1		1	
6	PVCL004ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
7	PVCL004RADMINVEC01	Radiator 1: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
10	PVCL004RADMINVAM01	Radiator 1: Minutes ON	minutes		1		1	Cumulative in the hour
12	PVCL004RADHOUVAM01	Radiator 1: Hours ON	hours		1		1	Cumulative from the installation
8	PVCL004RADMINVEC02	Radiator 2: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
9	PVCL004RADPIDORC01	Radiator 2: Minutes ON	minutes		1		1	Cumulative in the hour
11	PVCL004RADMINVAM02	Radiator 2: Hours ON	hours		1		1	Cumulative from the installation
13	PVCL004RADHOUVAM02	Radiators: Control signal	%		1		1	**PID < 33% R1 & R2 = OFF; 34% < PID < 66% R1 = ON & R2 = OFF; PID > 66% R1 & R2 ON**
14	PVCL004WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
15	PVCL004OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic**; **1 = manual**; **2 = stand-by**.
16	PVCL004RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
17	PVCL004RADTHRADS02	Threshold Radiator 2	°C		1		1	Set-Point to switch ON/OFF Valve 2. **used by IES only to calibrate the building model**
18	PVCL004ALIWAITIT01	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	PVCL004ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **PVCL004ALIMINLIM01** in the specific time interval
2	PVCL004ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **PVCL004ATIROOTEM01** in the specific time interval
3	PVCL004ATISPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **PVCL004ATIROOTES01** in the specific time interval.
4	PVCL004OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	Averaged value [Number of events **PVCL004OCCPRESEM01>0**] *** 5 [minutes]**, in the time interval
5	PVCL004RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	3	ABS (last value - first value) of **PVCL004RADMINVAM01** in the specific time interval
6	PVCL004RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	3	ABS (last value - first value) of **PVCL004RADMINVAM02** in the specific time interval
7	PVCL004WINWIOPEH01	Windows Opened	minutes	1	1	1	3	[Number of events that **PVCL004WINWIOPEM01 > 0**] *** 5 [minutes]**, in the specific time interval
8	PVCL004ALIERGCLH01	Room Lighting Energy Consumption	kWh	1	1	1		**[PVCL004ALIMINLIH01 * TotalWatt]/1000; TotalWatt = 530 [Watt]**
9	PVCL004THCENRGYH01	Room Thermal Energy Consumption	kWh	1	1	1		**[(PVCL004RADMINVAM01 + PVCL004RADMINVAM02) * N.Power]/1000; N.Power = 1661 [Watt]**
10	PVCL004ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		[**PVCL004ATIROOTEM01>PVCL004ATIROOTEM01**] AND [**PVCL004RADMINVAH01>0 OR**
11	PVCL004WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**PVCL004WINWIOPEH01>0 AND (PVCL004RADMINVAH01>0 OR PVCL004RADMINVAH02>0)**]
12	PVCL004OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**PVCL004OCCROWOWM01 <> 0**] in the specific time interval
13	PVCL004ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[**PVCL004ALIMINLIH01>0** AND **PVCL004OCCPRESEH01=0**] in the specific time interval
14	PVCL004THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
15	PVCL004THCLTHSOH01	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 4-5: Room 1304 - physical measurement and HQDS variables.

	Label	Class Room #1305	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.15 - Data received by DOKI - Data Transmission = 5 minutes.
1	PVCL005ALILIFLUC01	Lighting: Status Circuit 1	ON/OFF	1			**1**	0 = OFF; 1 = ON. type fluorescent
2	PVCL005ALIMINLIM01	Lighting: Minutes ON Circuit 1	minutes		1		**1**	Cumulative in the hour
3	PVCL005ALIHOULIM01	Lighting: Hours ON Circuit 1	hours		1		**1**	Cumulative from the installation
4	PVCL005ALILIFLUC02	Lighting: Status Circuit 2	ON/OFF	1			**1**	0 = OFF; 1 = ON. type fluorescent
5	PVCL005ALIMINLIM02	Lighting: Minutes ON Circuit 2	minutes		1		**1**	Cumulative in the hour
6	PVCL005ALIHOULIM02	Lighting: Hours ON Circuit 2	hours		1		**1**	Cumulative from the installation
7	PVCL005OCCPRESEM01	Presence Sensor	yes / no	1			**1**	0 = NO; 1 = YES
8	PVCL005ATIROOTEM01	Room Temperature	°C		1		**1**	
9	PVCL005ATIROOTES01	Set-Point Room Temperature	°C		1		**1**	Current Set-Point of the Room Temperature
10	PVCL005RADMINVEC01	Radiator 1: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON
11	PVCL005RADMINVAM01	Radiator 1: Minutes ON	minutes		1		**1**	Cumulative in the hour
12	PVCL005RADHOUVAM01	Radiator 1: Hours ON	hours		1		**1**	Cumulative from the installation
13	PVCL005RADMINVEC02	Radiator 2: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON
14	PVCL005RADMINVAM02	Radiator 2: Minutes ON	minutes		1		**1**	Cumulative in the hour
15	PVCL005RADHOUVAM02	Radiator 2: Hours ON	hours		1		**1**	Cumulative from the installation
16	PVCL005RADPIDORC01	Radiators: Control signal	%		1		**1**	**PID < 33% R1 & R2 = OFF; 34% < PID < 66% R1 = ON & R2 = OFF; PID > 66% R1 & R2 ON**
17	PVCL005WINWIOPEM01	Windows: status	close/open	1			**1**	0 = Windows CLOSED; 1 = Windows OPENED
18	PVCL005OCCROWOWM01	Room Control Status	-		1		**1**	**0 = automatic**; **1 = manual**; **2 = stand-by**.
19	PVCL005RADTHRADS01	Threshold Radiator 1	°C		1		**1**	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
20	PVCL005RADTHRADS02	Threshold Radiator 2	°C		1		**1**	Set-Point to switch ON/OFF Valve 2. **used by IES only to calibrate the building model**
21	PVCL005ALIWAITIT01	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	PVCL005ALIMINLIH01	Lighting: Minutes ON Circuit 1	minutes	1	1	1	**3**	ABS (last value - first value) of **PVCL005ALIMINLIM01** in the specific time interval
2	PVCL005ALIMINLIH02	Lighting: Minutes ON Circuit 2	minutes	1	1	1	**3**	ABS (last value - first value) of **PVCL005ALIMINLIM02** in the specific time interval
3	PVCL005ATIROOTEH01	Room Temperature	°C	1	1	1	**3**	Average among all value of **PVCL005ATIROOTEM01** in the specific time interval
4	PVCL005ATSPTEMH01	Set-Point Room Temperature	°C	1	1		**2**	Last value of **PVCL005ATIROOTES01** in the specific time interval.
5	PVCL005OCCPRESEH01	Presence Sensor	minutes	1	1	1	**3**	Averaged value [Number of events **PVCL005OCCPRESEM01>0**] *** 5 [minutes]**, in the time interval
6	PVCL005RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	**3**	ABS (last value - first value) of **PVCL005RADMINVAM01** in the specific time interval
7	PVCL005RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	**3**	ABS (last value - first value) of **PVCL005RADMINVAM02** in the specific time interval
8	PVCL005WINWIOPEH01	Windows Opened	minutes	1	1	1	**3**	[Number of events that **PVCL005WINWIOPEM01 > 0**] *** 5 [minutes]**, in the specific time interval
9	PVCL005ALIERGCLH01	Room Lighting Energy Consumption	kWh	1	1	1		**Circuit1 = [PVCL005ALIMINLIH01 * TotalWatt_C1]/1000; TotalWatt_C1 = 420 [Watt]** **Circuit2 = [PVCL005ALIMINLIH02 * TotalWatt_C2]/1000; TotalWatt_C2 = 90 [Watt]**
10	PVCL005THCENRGYH01	Room Thermal Energy Consumption	kWh	1	1	1		**[(PVCL005RADMINVAM01 + PVCL005RADMINVAM02) * N.Power]/1000; N.Power = 1661 [Watt]**
10	PVCL005ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		[**PVCL005ATIROOTEM01>PVCL005ATIROOTEM01**] AND [**PVCL005RADMINVAH0x>0**], x = 1, 2
11	PVCL005WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[PVCL005WINWIOPEH01>0 AND (PVCL005RADMINVAH01>0 OR PVCL005RADMINVAH02>0)]**
12	PVCL005OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		**[PVCL005OCCROWOWM01 <> 0]** in the specific time interval
13	PVCL005ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[(PVCL005ALIMINLIH01 > 0 OR PVCL005ALIMINLIH02 > 0) AND PVCL005OCCPRESEH01=0)]**
14	PVCL005THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
15	PVCL005THCLTHSOH01	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 4-6: Room 1305 - physical measurement and HQDS variables.

	Label	Class Room #1306	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.16 - Data received by DOKI - Data Transmission = 5 minutes.
1	PVCL006ALILIFLUC01	Lighting: Status Circuit 1	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	PVCL006ALIMINLIM01	Lighting: Minutes ON Circuit 1	minutes		1		1	Cumulative in the hour
3	PVCL006ALIHOULIM01	Lighting: Hours ON Circuit 1	hours		1		1	Cumulative from the installation
4	PVCL006ALILIFLUC02	Lighting: Status Circuit 2	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
5	PVCL006ALIMINLIM02	Lighting: Minutes ON Circuit 2	minutes		1		1	Cumulative in the hour
6	PVCL006ALIHOULIM02	Lighting: Hours ON Circuit 2	hours		1		1	Cumulative from the installation
7	PVCL006OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
8	PVCL006ATIROOTEM01	Room Temperature	°C		1		1	
9	PVCL006ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
10	PVCL006RADMINVEC01	Radiator 1: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
11	PVCL006RADMINVAM01	Radiator 1: Minutes ON	minutes		1		1	Cumulative in the hour
12	PVCL006RADHOUVAM01	Radiator 1: Hours ON	hours		1		1	Cumulative from the installation
13	PVCL006RADMINVEC02	Radiator 2: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
14	PVCL006RADMINVAM02	Radiator 2: Minutes ON	minutes		1		1	Cumulative in the hour
15	PVCL006RADHOUVAM02	Radiator 2: Hours ON	hours		1		1	Cumulative from the installation
16	PVCL006RADPIDORC01	Radiators: Control signal	%		1		1	**PID < 33% R1 & R2 = OFF; 34% < PID < 66% R1 = ON & R2 = OFF; PID > 66% R1 & R2 ON**
17	PVCL006WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
18	PVCL006OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic**; **1 = manual**; **2 = stand-by**.
19	PVCL006RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
20	PVCL006RADTHRADS02	Threshold Radiator 2	°C		1		1	Set-Point to switch ON/OFF Valve 2. **used by IES only to calibrate the building model**
21	PVCL006ALIWAITIT01	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	PVCL006ALIMINLIH01	Lighting: Minutes ON Circuit 1	minutes	1	1	1	3	ABS (last value - first value) of **PVCL006ALIMINLIM01** in the specific time interval
2	PVCL006ALIMINLIH02	Lighting: Minutes ON Circuit 2	minutes	1	1	1	3	ABS (last value - first value) of **PVCL006ALIMINLIM02** in the specific time interval
3	PVCL006ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **PVCL006ATIROOTEM01** in the specific time interval
4	PVCL006ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **PVCL006ATIROOTES01** in the specific time interval.
5	PVCL006OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	Averaged value [Number of events **PVCL006OCCPRESEM01>0**] * **5 [minutes]**, in the time interval
6	PVCL006RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	3	ABS (last value - first value) of **PVCL006RADMINVAM01** in the specific time interval
7	PVCL006RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	3	ABS (last value - first value) of **PVCL006RADMINVAM02** in the specific time interval
8	PVCL006WINWIOPEH01	Windows Opened	minutes	1	1	1	3	[Number of events that **PVCL006WINWIOPEM01 > 0**] * **5 [minutes]**, in the specific time interval
9	PVCL006ALIERGCOH01	Room Lighting Energy Consumption	kWh	1	1	1		**Circuit1 = [PVCL006ALIMINLIH01 * TotalWatt_C1]/1000; TotalWatt_C1 = (4x2x58W) = 464 [Watt]** **Circuit2 = [PVCL006ALIMINLIH02 * TotalWatt_C2]/1000; TotalWatt_C2 = (3x2x58W) = 348 [Watt]**
10	PVCL006THCENRGYH01	Room Thermal Energy Consumption	kWh	1	1	1		**[(PVCL006RADMINVAM01 + PVCL006RADMINVAM02) * N.Power]/1000; N.Power = 1661 [Watt]**
10	PVCL006ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		[**PVCL006ATIROOTEM01>PVCL006ATIROOTEM01**] AND [**PVCL006RADMINVAH0x>0**], x = 1, 2
11	PVCL006WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[PVCL006WINWIOPEH01>0 AND (PVCL006RADMINVAH01>0 OR PVCL006RADMINVAH02>0)]**
12	PVCL006OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		**[PVCL006OCCROWOWM01 <> 0]** in the specific time interval
13	PVCL006ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[(PVCL006ALIMINLIH01 > 0 OR PVCL006ALIMINLIH02 > 0) AND PVCL006OCCPRESEH01=0)]**
14	PVCL006THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
15	PVCL006THCLTHSOH01	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 4-7: Room 1306 - physical measurement and HQDS variables.

	Label	Class Room 1307 (with LED & dimming)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.17 - Data received by DOKI - Data Transmission = 5 minutes.
1	PVCL007ALIOLPIDD01	Lighting: Control signal	volt		1		1	**PID output 0÷10 [volt]. Status: ON = LECL007ALIOLPIDD01>0; OFF = LECL007ALIOLPIDD01=0.**
2	PVCL007ALIBLRROM01	Room Brightness	lux		1		1	Brightness measurement.
3	PVCL007ALISPBLRS01	Set Point Room Brightness	lux		1		1	Brightness Setpoint
4	PVCL007OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	PVCL007ATIROOTEM01	Room Temperature	°C		1		1	
6	PVCL006ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
7	PVCL007RADMINVEC01	Radiator 1: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
8	PVCL007RADMINVAM01	Radiator 1: Minutes ON	minutes		1		1	Cumulative in the hour
9	PVCL007RADHOUVAM01	Radiator 1: Hours ON	hours		1		1	Cumulative from the installation
10	PVCL007RADMINVEC02	Radiator 2: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
11	PVCL007RADMINVAM02	Radiator 2: Minutes ON	minutes		1		1	Cumulative in the hour
12	PVCL007RADHOUVAM02	Radiator 2: Hours ON	hours		1		1	Cumulative from the installation
13	PVCL007RADPIDORC01	Radiators: Control signal	%		1		1	**PID < 33% R1 & R2 = OFF; 34% < PID < 66% R1 = ON & R2 = OFF; PID > 66% R1 & R2 ON**
14	PVCL007WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
15	PVCL007OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
16	PVCL007RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
17	PVCL007RADTHRADS02	Threshold Radiator 2	°C		1		1	Set-Point to switch ON/OFF Valve 2. **used by IES only to calibrate the building model**
18	PVCL007ALITRELIS01	Threshold Light 1	%		1		1	Refers to PVCL307ALITRELIS01. **It is used by IES only for calibrating the building model.**
19	PVCL007ALIWAITIT01	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	PVCL007ALILILEDH01	Lighting: Control signal	volt	1	1	1	3	Average among all value of **PVCL007ALIOLPIDD01** in the specific time interval
2	PVCL007ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **PVCL007ALIMINLIM01** in the specific time interval
3	PVCL007ALIBLRROH01	Room Brightness	Lux	1	1	1	3	Average among all value of **PVCL007ALIBLRROM01** in the specific time interval
4	PVCL007ALISPBLRH01	Set Point Room Brightness	Lux	1	1	1	3	Last value of **PVCL007ALISPBLRS01** in the specific time interval
5	PVCL007ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **PVCL007ATIROOTEM01** in the specific time interval
6	PVCL007ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **PVCL007ATIROOTES01** in the specific time interval.
7	PVCL007OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	Averaged value [Number of events **PVCL007OCCPRESEM01>0**] *** 5 [minutes]**, in the time interval
8	PVCL007RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	3	ABS (last value - first value) of **PVCL007RADMINVAM01** in the specific time interval
9	PVCL007RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	3	ABS (last value - first value) of **PVCL007RADMINVAM02** in the specific time interval
10	PVCL007WINWIOPEH01	Windows Opened	minutes	1	1	1	3	[Number of events that **PVCL007WINWIOPEM01 > 0**] *** 5 [minutes]**, in the specific time interval
11	PVCL007ALIERGCLH01	Room Lighting Energy Consumption	kWh	1	1	1		**[PVCL007ALIMINLIH01 * (PVCL007ALILILEDH01/10) * TotalW]/1000; TotalW = (8 x 60W) = 480 [Watt]**
12	PVCL007THCENRGYH01	Room Thermal Energy Consumption	kWh	1	1	1		**[(PVCL007RADMINVAM01 + PVCL007RADMINVAM02) * N.Power]/1000; N.Power = 1661 [Watt]**
13	PVCL007ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		**[PVCL007ATIROOTEH01 > PVCL007OCCPRESEM01]** AND [**PVCL007RADMINVAH0x>0**], x = 1, 2
14	PVCL007ATILHTSPH01	"Luxamb < Set-point & Light ON"	events	1	1	1		**[PVCL007ALIBLRROH01 < PVCL007ALISPBLRH01]** AND [**PVCL007ALIOLPIDD01>0**] in the interval
15	PVCL007WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[PVCL007WINWIOPEH01>0 AND (PVCL007RADMINVAH01>0 OR PVCL007RADMINVAH02 > 0)]**
16	PVCL007OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		**[PVCL007OCCROWOWM01 <> 0]** in the specific time interval
17	PVCL007ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[PVCL007ALIMINLIH01>0 AND PVCL007OCCPRESEM01=0]** in the interval
18	PVCL007THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
19	PVCL007THCLTHSOH01	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: Room 1307 - physical measurement and HQDS variables.

	Label	Class Room #1308	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.18 - Data received by DOKI - Data Transmission = 5 minutes.
1	PVCL008ALILIFLUC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	PVCL008ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour.
3	PVCL008ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative for the installation.
4	PVCL008OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	PVCL008ATIROOTEM01	Room Temperature	°C		1		1	
6	PVCL008ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
7	PVCL008RADMINVEC01	Radiator: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
8	PVCL008RADMINVAM01	Radiator: Minutes ON	minutes		1		1	Cumulative in the hour
9	PVCL008RADHOUVAM01	Radiator: Hours ON	hours		1		1	Cumulative from the installation
10	PVCL008RADPIDORC01	Radiator: Control signal	%		1		1	**Control signal: < 50% R1 = OFF; > 50% R1 = ON**
11	PVCL008WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
12	PVCL008OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
13	PVCL008RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve. **It is used by IES only for calibrating the building model.**
14	PVCL008ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				4	**10**	**0**	**14**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	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	PVCL008ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **PVCL008ALIMINLIM01** in the specific time interval
2	PVCL008ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **PVCL008ATIROOTEM01** in the specific time interval
3	PVCL008ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **PVCL008ATIROOTES01** in the specific time interval.
4	PVCL008OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	Averaged value [Number of events **PVCL008OCCPRESEM01>0**] *** 5 [minutes]**, in the time interval
5	PVCL008RADMINVAH01	Radiator: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **PVCL008RADMINVAM01** in the specific time interval
6	PVCL008WINWIOPEH01	Windows Opened	minutes	1	1	1	3	[Number of events that **PVCL008WINWIOPEM01 > 0**] *** 5 [minutes]**, in the specific time interval
7	PVCL008ALIERGCLH01	Room Lighting Energy Consumption	kWh	1	1	1		**[PVCL008ALIMINLIH01 * TotalWatt]/1000; TotalWatt = (4 x 2 x 40W) = 320 [Watt]**
8	PVCL008THCENRGYH01	Room Thermal Energy Consumption	kWh	1	1	1		**[PVCL008RADMINVAM01 * N.Power]/1000; N.Power = 2114 [Watt]**
9	PVCL008ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		[**PVCL008ATIROOTEM01>PVCL008ATIROOTEM01**] AND [**PVCL008RADMINVAH01>0**]
10	PVCL008WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[PVCL008WINWIOPEH01>0 AND PVCL008RADMINVAH01>0]** in the time interval
11	PVCL008OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		**[PVCL008OCCROWOWM01 <> 0]** in the specific time interval
12	PVCL008ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[PVCL008ALIMINLIH01>0 AND PVCL008OCCPRESEH01=0)]** in the time interval
13	PVCL008THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
14	PVCL008THCLTHSOH01	Last Time heating system OFF	timestamp			1		The last time the heating system is turned OFF during the whole day.
			TOTALS	**12**	**12**	**13**	**17**	
				54				

Figure 4-9: Room 1308 - physical measurement and HQDS variables.

	Label	Class Room #1309 (LED & dim)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.19 - Data received by DOKI - Data Transmission = 5 minutes.
1	PVCL009ALIOLPIDD01	Lighting: Control signal	volt		1		**1**	**PID output 0÷10 [volt]. Status: ON = LECL007ALIOLPIDD01>0; OFF = LECL007ALIOLPIDD01=0**.
2	PVCL009ALIBLRROM01	Room Brightness	lux		1		**1**	Brightness measurement. **2 switches to make dimming UP and DOWN**.
3	PVCL009ALISPBLRS01	Set Point Room Brightness	lux		1		**1**	Brightness Setpoint
4	PVCL009OCCPRESEM01	Presence Sensor	yes / no	1			**1**	0 = NO; 1 = YES
5	PVCL009ATIROOTEM01	Room Temperature	°C		1		**1**	
6	PVCL006ATIROOTES01	Set-Point Room Temperature	°C		1		**1**	Current Set-Point of the Room Temperature
7	PVCL009RADMINVEC01	Radiator 1: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON
8	PVCL009RADMINVAM01	Radiator 1: Minutes ON	minutes		1		**1**	Cumulative in the hour
9	PVCL009RADHOUVAM01	Radiator 1: Hours ON	hours		1		**1**	Cumulative from the installation
10	PVCL009RADMINVEC02	Radiator 2: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON
11	PVCL009RADMINVAM02	Radiator 2: Minutes ON	minutes		1		**1**	Cumulative in the hour
12	PVCL009RADHOUVAM02	Radiator 2: Hours ON	hours		1		**1**	Cumulative from the installation
13	PVCL009RADMINVEC03	Radiator 3: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON
14	PVCL009RADMINVAM03	Radiator 3: Minutes ON	minutes		1		**1**	Cumulative in the hour
15	PVCL009RADHOUVAM03	Radiator 3: Hours ON	hours		1		**1**	Cumulative from the installation
16	PVCL009RADMINVEC04	Radiator 4: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON
17	PVCL009RADMINVAM04	Radiator 4: Minutes ON	minutes		1		**1**	Cumulative in the hour
18	PVCL009RADHOUVAM04	Radiator 4: Hours ON	hours		1		**1**	Cumulative from the installation
19	PVCL009RADPIDORC01	Radiators: Control signal	%		1		**1**	**PID<22% Rads = OFF; 22%<PID<44% R1=ON; 44%<PID< 66% R1+R2=ON; 66%<PID<88% R1+R2+R3=ON; PID>88% Rads = ON.**
20	PVCL009WINWIOPEM01	Windows Open	yes / no	1			**1**	Status OPEN/CLOSE of the windows
21	PVCL009OCCROWOWM01	Room Control Status	-		1		**1**	**0 = automatic; 1 = manual; 2 = stand-by.**
22	PVCL009RADTHRADS01	Threshold Radiator 1	°C		1		**1**	Set-Point to switch ON/OFF Valve 1. **It is used by IES only for calibrating the building model.**
23	PVCL009RADTHRADS02	Threshold Radiator 2	°C		1		**1**	Set-Point to switch ON/OFF Valve 2. **It is used by IES only for calibrating the building model.**
24	PVCL009RADTHRADS03	Threshold Radiator 3	°C		1		**1**	Set-Point to switch ON/OFF Valve 3. **It is used by IES only for calibrating the building model.**
25	PVCL009RADTHRADS04	Threshold Radiator 4	°C		1		**1**	Set-Point to switch ON/OFF Valve 4. **It is used by IES only for calibrating the building model.**
26	PVCL009ALITRELIS01	Threshold Light 1	%		1		**1**	Refers to PVCL309ALITRELIS01. **It is used by IES only for calibrating the building model.**
27	PVCL009ALIWAITIT01	Waiting Time	minutes		1		**1**	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				6	**21**	**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	PVCL009ALILILEDH01	Lighting: Control signal	volt	1	1	1	**3**	Average among all value of **PVCL009ALIOLPIDD01** in the specific time interval
2	PVCL009ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	**3**	ABS (last value - first value) of **PVCL009ALIMINLIM01** in the specific time interval
3	PVCL009ALIBLRROH01	Room Brightness	Lux	1	1	1	**3**	Average among all value of **PVCL009ALIBLRROM01** in the specific time interval
4	PVCL009ALISPBLRH01	Set Point Room Brightness	Lux	1	1	1	**3**	Last value of **PVCL009ALISPBLRS01** in the specific time interval
5	PVCL009ATIROOTEH01	Room Temperature	°C	1	1	1	**3**	Average among all value of **PVCL009ATIROOTEM01** in the specific time interval
6	PVCL009ATSPTEMH01	Set-Point Room Temperature	°C	1	1		**2**	Last value of **PVCL009ATIROOTES01** in the specific time interval.
7	PVCL009OCCPRESEH01	Presence Sensor	minutes	1	1	1	**3**	Averaged value [Number of events **PVCL009OCCPRESEM01>0**] *** 5 [minutes]**, in the time interval
8	PVCL009RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	**3**	ABS (last value - first value) of **PVCL009RADMINVAM01** in the specific time interval
9	PVCL009RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	**3**	ABS (last value - first value) of **PVCL009RADMINVAM02** in the specific time interval
10	PVCL009RADMINVAH03	Radiators: Minutes ON Valve 3	minutes	1	1	1	**3**	ABS (last value - first value) of **PVCL009RADMINVAM03** in the specific time interval
11	PVCL009RADMINVAH04	Radiators: Minutes ON Valve 4	minutes	1	1	1	**3**	ABS (last value - first value) of **PVCL009RADMINVAM04** in the specific time interval
12	PVCL009WINWIOPEH01	Windows Opened	minutes	1	1	1	**3**	[Number of events that **PVCL009WINWIOPEM01 > 0**] *** 5 [minutes]**, in the specific time interval

	Label	Class Room #1309 (LED & dim)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.19 - Data received by DOKI - Data Transmission = 5 minutes.
13	PVCL009ALIERGCLH01	Lighting Energy Consumption	kWh	1	1	1		**[PVCL009ALIMINLIH01 * (PVCL009ALILILEDH01/10) * TotalWatt]/1000; TotalWatt = (9 x 60W) = 540 [Watt]**
14	PVCL009THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[(PVCL009RADMINVAM01 + PVCL009RADMINVAM02 + PVCL009RADMINVAM03 + PVCL009RADMINVAM04) * N.Power]/1000; N.Power = 2186 [Watt]**
15	PVCL009ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		**[PVCL009ATIROOTEH01 > PVCL009OCCPRESEM01]** AND [**PVCL009RADMINVAH01>0** OR **PVCL009RADMINVAH02>0 OR PVCL009RADMINVAH03>0 OR PVCL009RADMINVAH04>0**]
16	PVCL009ATILHTSPH01	"Luxamb < Set-point & Light ON"	events	1	1	1		**[PVCL009ALIBLRROH01 < PVCL009ALISPBLRH01]** AND [**PVCL009ALIOLPIDD01>0**] in the interval
17	PVCL009WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[PVCL009WINWIOPEH01>0 AND (PVCL009RADMINVAH01>0 OR PVCL009RADMINVAH02 > 0 OR PVCL009RADMINVAH03>0 OR PVCL009RADMINVAH04 > 0)]** in the time interval
18	PVCL009OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		**[PVCL009OCCROWOWM01 <> 0]** in the specific time interval
19	PVCL009ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[PVCL009ALIMINLIH01>0 AND PVCL009OCCPRESEM01=0]** in the interval
20	PVCL009THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
21	PVCL009THCLTHSOH01	Last Time heating system OFF	timestamp			1		The last time the heating system is turned OFF during the whole day.
			TOTALS	**19**	**19**	**20**	**35**	
				93				

Figure 4-10: Room 1309 - physical measurement and HQDS variables.

	Label	Library	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.22 - Data received by DOKI - Data Transmission = 5 minutes.
1	PVLY001ALILIFLUC01	Lighting: Status Circuit 1	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	PVLY001ALIMINLIM01	Lighting: Minutes ON Circuit 1	minutes		1		1	Cumulative in the hour
3	PVLY001ALIHOULIM01	Lighting: Hours ON Circuit 1	hours		1		1	Cumulative from the installation
4	PVLY001ALILIFLUC02	Lighting: Status Circuit 2	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
5	PVLY001ALIMINLIM02	Lighting: Minutes ON Circuit 2	minutes		1		1	Cumulative in the hour
6	PVLY001ALIHOULIM02	Lighting: Hours ON Circuit 2	hours		1		1	Cumulative from the installation
7	PVLY001ALILIFLUC03	Lighting: Status Circuit 3	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
8	PVLY001ALIMINLIM03	Lighting: Minutes ON Circuit 3	minutes		1		1	Cumulative in the hour
9	PVLY001ALIHOULIM03	Lighting: Hours ON Circuit 3	hours		1		1	Cumulative from the installation
10	PVLY001OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES.
11	PVLY001ATIROOTEM01	Room Temperature	°C		1		1	
12	PVLY001ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
13	PVLY001RADMINVEC01	Radiator 1: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
14	PVLY001RADMINVAM01	Radiator 1: Minutes ON	minutes		1		1	Cumulative in the hour
15	PVLY001RADHOUVAM01	Radiator 1: Hours ON	hours		1		1	Cumulative from the installation
16	PVLY001RADMINVEC02	Radiator 2: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
17	PVLY001RADMINVAM02	Radiator 2: Minutes ON	minutes		1		1	Cumulative in the hour
18	PVLY001RADHOUVAM02	Radiator 2: Hours ON	hours		1		1	Cumulative from the installation
19	PVLY001RADMINVEC03	Radiator 3: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
20	PVLY001RADMINVAM03	Radiator 3: Minutes ON	minutes		1		1	Cumulative in the hour
21	PVLY001RADHOUVAM03	Radiator 3: Hours ON	hours		1		1	Cumulative from the installation
22	PVLY001RADPIDORC01	Radiators: Control signal	%		1		1	**PID<25% Rads = OFF; 25%<PID<50% R1=ON; 50%<PID<75% R1+R2=ON; PID>75% Rads = ON.**
23	PVLY001WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
24	PVLY001OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
25	PVLY001RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve 1. **It is used by IES only for calibrating the building model.**
26	PVLY001RADTHRADS02	Threshold Radiator 2	°C		1		1	Set-Point to switch ON/OFF Valve 2. **It is used by IES only for calibrating the building model.**
27	PVLY001RADTHRADS03	Threshold Radiator 3	°C		1		1	Set-Point to switch ON/OFF Valve 3. **It is used by IES only for calibrating the building model.**
28	PVLY001ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				8	**20**	**0**	**28**	

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	PVLY001ALIMINLIH01	Lighting: Minutes ON Circuit 1	minutes	1	1	1	3	ABS (last value - first value) of **PVLY001ALIMINLIM01** in the specific time interval
2	PVLY001ALIMINLIH02	Lighting: Minutes ON Circuit 2	minutes	1	1	1	3	ABS (last value - first value) of **PVLY001ALIMINLIM02** in the specific time interval
3	PVLY001ALIMINLIH03	Lighting: Minutes ON Circuit 3	minutes	1	1	1	3	ABS (last value - first value) of **PVLY001ALIMINLIM032** in the specific time interval
4	PVLY001ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **PVLY001ATIROOTEM01** in the specific time interval
5	PVLY001ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **PVLY001ATIROOTES01** in the specific time interval.
6	PVLY001OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	Averaged value [Number of events **PVLY001OCCPRESEM01>0**] *** 5 [minutes]**, in the time interval
7	PVLY001RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	3	ABS (last value - first value) of **PVLY001RADMINVAM01** in the specific time interval
8	PVLY001RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	3	ABS (last value - first value) of **PLY001RADMINVAM02** in the specific time interval
9	PVLY001RADMINVAH03	Radiators: Minutes ON Valve 3	minutes	1	1	1	3	ABS (last value - first value) of **PVLY001RADMINVAM03** in the specific time interval
10	PVLY001WINWIOPEH01	Windows Opened	minutes	1	1	1	3	[Number of events that **PVLY001WINWIOPEM01 > 0**] * 5 [minutes], in the specific time interval

	Label	Library	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.22 - Data received by DOKI - Data Transmission = 5 minutes.
11	PVLY001ALIERGCOH01	Room Lighting Energy Consumption	kWh	1	1	1		**[Circuit1] + [Circuit2] + [Circuit3]. TotalWatt = 2400 [Watt].** **Circuit1 = [PVLY001ALIMINLIH01 * TotalWatt_C1]/1000; TotalWatt_C1 = (16 x 60W) = 960 [Watt]** **Circuit2 = [PVLY001ALIMINLIH02 * TotalWatt_C2]/1000; TotalWatt_C2 = (24 x 60W) = 1440 [Watt]** **Circuit3 = [PVLY001ALIMINLIH03 * TotalWatt_C3]/1000; TotalWatt_C3 = 0 [Watt]. It doesn't work.**
12	PVLY001THCENRGYH01	Room Thermal Energy Consumption	kWh	1	1	1		**[(PVLY001RADMINVAM01+PVLY001RADMINVAM02+PVLY001RADMINVAM03) * N.Power]/1000; N.Power=1488 [Watt]**
13	PVLY001ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		**[PVLY001ATIROOTEH01 > PVLY001OCCPRESEM01]** AND [**PVLY001RADMINVAH01>0** OR **PVLY001RADMINVAH02>0 OR PVLY001RADMINVAH03>0**]
14	PVLY001WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[PVLY001WINWIOPEH01>0** AND **(PVLY001RADMINVAH01>0** OR **PVLY001RADMINVAH02>0** OR **PVLY001RADMINVAH03>0)]**
15	PVLY001OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		**[PVLY001OCCROWOWM01 <> 0]** in the specific time interval
16	PVLY001ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[(PVLY001ALIMINLIH01>0 OR PVLY001ALIMINLIH02>0 OR PVLY001ALIMINLIH03>0)** AND **PVLY001OCCPRESEM01=0]**
17	PVLY001THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
18	PVLY001THCLTHSOH01	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: Library - physical measurement and HQDS variables.

	Label	Library #2 (Office)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.25 - Data received by DOKI - Data Transmission = 5 minutes.
1	PVLY002ALILIFLUC01	Lighting: Status Circuit 1	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	PVLY002ALIMINLIM01	Lighting: Minutes ON Circuit 1	minutes		1		1	Cumulative in the hour
3	PVLY002ALIHOULIM01	Lighting: Hours ON Circuit 1	hours		1		1	Cumulative from the installation
4	PVLY002ALILIFLUC02	Lighting: Status Circuit 2	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
5	PVLY002ALIMINLIM02	Lighting: Minutes ON Circuit 2	minutes		1		1	Cumulative in the hour
6	PVLY002ALIHOULIM02	Lighting: Hours ON Circuit 2	hours		1		1	Cumulative from the installation
7	PVLY002OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
8	PVLY002ATIROOTEM01	Room Temperature	°C		1		1	
9	PVLY002ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
10	PVLY002RADMINVEC01	Radiator 1: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
11	PVLY002RADMINVAM01	Radiator 1: Minutes ON	minutes		1		1	Cumulative in the hour
12	PVLY002RADHOUVAM01	Radiator 1: Hours ON	hours		1		1	Cumulative from the installation
13	PVLY002RADMINVEC02	Radiator 2: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
14	PVLY002RADMINVAM02	Radiator 2: Minutes ON	minutes		1		1	Cumulative in the hour
15	PVLY002RADHOUVAM02	Radiator 2: Hours ON	hours		1		1	Cumulative from the installation
16	PVLY002RADMINVEC03	Radiator 3: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
17	PVLY002RADMINVAM03	Radiator 3: Minutes ON	minutes		1		1	Cumulative in the hour
18	PVLY002RADHOUVAM03	Radiator 3: Hours ON	hours		1		1	Cumulative from the installation
19	PVLY002RADMINVEC04	Radiator 4: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
20	PVLY002RADMINVAM04	Radiator 4: Minutes ON	minutes		1		1	Cumulative in the hour
21	PVLY002RADHOUVAM04	Radiator 4: Hours ON	hours		1		1	Cumulative from the installation
22	PVLY002RADPIDORC01	Radiators: Control signal	%		1		1	**PID<22% Rads = OFF; 22%<PID<44% R1=ON; 44%<PID< 66% R1+R2=ON; 66%<PID<88% R1+R2+R3=ON; PID>88% Rads = ON.**
23	PVLY002WINWIOPEM01	Windows Open	yes / no	1			1	Status OPEN/CLOSE of the windows
24	PVLY002OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
25	PVLY002RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve 1. **It is used by IES only for calibrating the building model.**
26	PVLY002RADTHRADS02	Threshold Radiator 2	°C		1		1	Set-Point to switch ON/OFF Valve 2. **It is used by IES only for calibrating the building model.**
27	PVLY002RADTHRADS03	Threshold Radiator 3	°C		1		1	Set-Point to switch ON/OFF Valve 3. **It is used by IES only for calibrating the building model.**
28	PVLY002RADTHRADS04	Threshold Radiator 4	°C		1		1	Set-Point to switch ON/OFF Valve 4. **It is used by IES only for calibrating the building model.**
29	PVLY002ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				8	**21**	**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	PVLY002ALIMINLIH01	Lighting: Minutes ON Circuit 1	minutes	1	1	1	3	ABS (last value - first value) of **PVLY002ALIMINLIM01** in the specific time interval
2	PVLY002ALIMINLIH02	Lighting: Minutes ON Circuit 2	minutes	1	1	1	3	ABS (last value - first value) of **PVLY002ALIMINLIM02** in the specific time interval
3	PVLY002ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **PVLY002ATIROOTEM01** in the specific time interval
4	PVLY002ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **PVLY002ATIROOTES01** in the specific time interval.
5	PVLY002OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	Averaged value [Number of events **PVLY002OCCPRESEM01>0**] *** 5 [minutes]**, in the time interval
6	PVLY002RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	3	ABS (last value - first value) of **PVLY002RADMINVAM01** in the specific time interval
7	PVLY002RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	3	ABS (last value - first value) of **PVLY002RADMINVAM02** in the specific time interval
8	PVLY002RADMINVAH03	Radiators: Minutes ON Valve 3	minutes	1	1	1	3	ABS (last value - first value) of **PVLY002RADMINVAM03** in the specific time interval
9	PVLY002RADMINVAH04	Radiators: Minutes ON Valve 4	minutes	1	1	1	3	ABS (last value - first value) of **PVLY002RADMINVAM04** in the specific time interval
10	PVLY002WINWIOPEH01	Windows Opened	minutes	1	1	1	3	[Number of events that **PVLY002WINWIOPEM01 > 0**] * 5 [minutes], in the specific time interval

	Label	Library #2 (Office)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.25 - Data received by DOKI - Data Transmission = 5 minutes.
11	PVLY002ALIERGCOH01	Room Lighting Energy Consumption	kWh	1	1	1		**[Circuit1] + [Circuit2]. TotalWatt = (1 x 32 x 60W) + (1 x 32 x 60W) = 3840 [Watt].** **Circuit1 = [PVLY002ALIMINLIH01 * TotalWatt_C1]/1000; TotalWatt_C1 = (1 x 32 x 60W) = 1920 [Watt]** **Circuit2 = [PVLY002ALIMINLIH02 * TotalWatt_C2]/1000; TotalWatt_C2 = (1 x 32 x 40W) = 1920 [Watt]**
12	PVLY002THCENRGYH01	Room Thermal Energy Consumption	kWh	1	1	1		**[(PVLY002RADMINVAM01+PVLY002RADMINVAM02+PVLY002RADMINVAM03+PVLY002RADMINVAM04) * N.Power]/1000. N.Power = 1488 [Watt]**
13	PVLY002ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		**[PVLY002ATIROOTEH01>PVLY002OCCPRESEM01]** AND [**PVLY002RADMINVAH01>0** OR **PVLY002RADMINVAH02>0 OR PVLY002RADMINVAH03>0 OR PVLY002RADMINVAH04>0**]
14	PVLY002WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[PVLY002WINWIOPEH01>0** AND **(PVLY002RADMINVAH01>0** OR **PVLY002RADMINVAH02>0** OR **PVLY002RADMINVAH03>0 OR PVLY002RADMINVAH04>0)]**
15	PVLY002OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		**[PVLY002OCCROWOWM01 <> 0]** in the specific time interval
16	PVLY002ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[(PVLY002ALIMINLIH01>0 OR PVLY002ALIMINLIH02>0)** AND **PVLY002OCCPRESEM01=0]**
17	PVLY002THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
18	PVLY002THCLTHSOH01	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 4-12: Library #2 (Office) - physical measurement and HQDS variables.

	Label	Corridor #1	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.20 - Data received by DOKI - Data Transmission = 5 minutes.
1	PVCO001ALILIFLUC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	PVCO001ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour.
3	PVCO001ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative for the installation.
4	PVCO001OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES. **There are 4 presence sensors associated to the single control signal PVCO001ALILIFLUC01.**
5	PVCO001ATIROOTEM01	Room Temperature	°C		1		1	
6	PVCO001ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
7	PVCO001RADMINVEC01	Radiator 1: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
8	PVCO001RADMINVAM01	Radiator 1: Minutes ON	minutes		1		1	Cumulative in the hour
9	PVCO001RADHOUVAM01	Radiator 1: Hours ON	hours		1		1	Cumulative from the installation
10	PVCO001RADMINVEC02	Radiator 2: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
11	PVCO001RADMINVAM02	Radiator 2: Minutes ON	minutes		1		1	Cumulative in the hour
12	PVCO001RADHOUVAM02	Radiator 2: Hours ON	hours		1		1	Cumulative from the installation
13	PVCO001RADMINVEC03	Radiator 3: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
14	PVCO001RADMINVAM03	Radiator 3: Minutes ON	minutes		1		1	Cumulative in the hour
15	PVCO001RADHOUVAM03	Radiator 3: Hours ON	hours		1		1	Cumulative from the installation
16	PVCO001RADMINVEC04	Radiator 4: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
17	PVCO001RADMINVAM04	Radiator 4: Minutes ON	minutes		1		1	Cumulative in the hour
18	PVCO001RADHOUVAM04	Radiator 4: Hours ON	hours		1		1	Cumulative from the installation
19	PVCO001RADPIDORC01	Radiators: Control signal	%		1		1	**PID<22% Rads = OFF; 22%<PID<44% R1=ON; 44%<PID< 66% R1+R2=ON; 66%<PID<88% R1+R2+R3=ON; PID>88% Rads = ON.**
20	PVCO001WINWIOPEM01	Windows Open	yes / no	1			1	Status OPEN/CLOSE of the windows
21	PVCO001OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
22	PVCO001RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve 1. **It is used by IES only for calibrating the building model.**
23	PVCO001RADTHRADS02	Threshold Radiator 2	°C		1		1	Set-Point to switch ON/OFF Valve 2. **It is used by IES only for calibrating the building model.**
24	PVCO001RADTHRADS03	Threshold Radiator 3	°C		1		1	Set-Point to switch ON/OFF Valve 3. **It is used by IES only for calibrating the building model.**
25	PVCO001RADTHRADS04	Threshold Radiator 4	°C		1		1	Set-Point to switch ON/OFF Valve 4. **It is used by IES only for calibrating the building model.**
26	PVCO001ALIWAITIT01	Waiting Time	minutes		1		1	time delay to switch OFF the lights with no presence.**Used by IES only for calibrating the building model.**
				7	**19**	**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	PVCO001ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **PVCO001ALIMINLIM01** in the specific time interval
2	PVCO001ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **PVCO001ATIROOTEM01** in the specific time interval
3	PVCO001ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **PVCO001ATIROOTES01** in the specific time interval.
4	PVCO001OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	Averaged value [Number of events **PVCO001OCCPRESEM01>0**] *** 5 [minutes]**, in the time interval
5	PVCO001RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	3	ABS (last value - first value) of **PVCO001RADMINVAM01** in the specific time interval
6	PVCO001RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	3	ABS (last value - first value) of **PVCO001RADMINVAM02** in the specific time interval
7	PVCO001RADMINVAH03	Radiators: Minutes ON Valve 3	minutes	1	1	1	3	ABS (last value - first value) of **PVCO001RADMINVAM03** in the specific time interval
8	PVCO001RADMINVAH04	Radiators: Minutes ON Valve 4	minutes	1	1	1	3	ABS (last value - first value) of **PVCO001RADMINVAM04** in the specific time interval
9	PVCO001WINWIOPEH01	Windows Opened	minutes	1	1	1	3	[Number of events that **PVCO001WINWIOPEM01 > 0**] * 5 [minutes], in the specific time interval
10	PVCO001ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**[PVCO001ALIMINLIH01 * TotalWatt_C1]/1000; TotalWatt = (5 x 2 x 40W) = 400 [Watt]**

	Label	Corridor #1	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.20 - Data received by DOKI - Data Transmission = 5 minutes.
11	PVCO001THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[(PVCO001RADMINVAM01+PVCO001RADMINVAM02+PVCO001RADMINVAM03+PVCO001RADMINVAM04) * N.Power]/1000. N.Power = 1931 [Watt]**
12	PVCO001ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		**[PVCO001ATIROOTEH01>PVCO001OCCPRESEM01]** AND **[PVCO001RADMINVAH01>0** OR **PVCO001RADMINVAH02>0 OR PVCO001RADMINVAH03>0 OR PVCO001RADMINVAH04>0]**
13	PVCO001WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[PVCO001WINWIOPEH01>0** AND **(PVCO001RADMINVAH01>0** OR **PVCO001RADMINVAH02>0** OR **PVCO001RADMINVAH03>0 OR PVCO001RADMINVAH04>0)]**
14	PVCO001OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		**[PVCO001OCCROWOWM01 <> 0]** in the specific time interval
15	PVCO001ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[PVCO001ALIMINLIH01>0** AND **PVCO001OCCPRESEM01=0]**
16	PVCO001THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
17	PVCO001THCLTHSOH01	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 4-13: Corridor #1 - physical measurement and HQDS variables.

	Label	Corridor #2	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.21 - Data received by DOKI - Data Transmission = 5 minutes.
1	PVCO002ALILIFLUC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	PVCO002ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour.
3	PVCO002ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative for the installation.
4	PVCO002OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	PVCO002ATIROOTEM01	Room Temperature	°C		1		1	
6	PVCO002ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
7	PVCO002RADMINVEC01	Radiator: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
8	PVCO002RADMINVAM01	Radiator: Minutes ON	minutes		1		1	Cumulative in the hour
9	PVCO002RADHOUVAM01	Radiator: Hours ON	hours		1		1	Cumulative from the installation
10	PVCO002RADPIDORC01	Radiator: Control signal	%		1		1	**Control signal: < 50% R1 = OFF; > 50% R1 = ON**
11	PVCO002WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
12	PVCO002OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
13	PVCO002RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve**. It is used by IES only for calibrating the building model.**
14	PVCO002ALIWAITIT01	Waiting Time	minutes		1		1	time delay to switch OFF the lights with no presence.**Used by IES only for calibrating the building model.**
				4	**10**	**0**	**14**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	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	PVCO002ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **PVCO002ALIMINLIM01** in the specific time interval
2	PVCO002ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **PVCO002ATIROOTEM01** in the specific time interval
3	PVCO002ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **PVCO002ATIROOTES01** in the specific time interval.
4	PVCO002OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	Averaged value [Number of events **PVCO002OCCPRESEM01>0**] *** 5 [minutes]**
5	PVCO002RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	3	ABS (last value - first value) of **PVCO002RADMINVAM01** in the specific time interval
6	PVCO002WINWIOPEH01	Windows Opened	minutes	1	1	1	3	[Number of events that **PVCO002WINWIOPEM01 > 0**] * 5 [minutes],
7	PVCO002ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**[PVCO002ALIMINLIH01 * TotalWatt]/1000; TotalWatt (2 x 3 x 40W) = 240 [Watt]**
8	PVCO002THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[PVCO002RADMINVAM01 * N.Power]/1000; N.Power = 3473 [Watt]**
9	PVCO002ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		**[PVCO002ATIROOTEH01 > PVCO002OCCPRESEM01]** AND [**PVCO002RADMINVAH01>0**]
10	PVCO002WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[PVCO002WINWIOPEH01>0** AND **PVCO002RADMINVAH01>0]**
11	PVCO002OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		**[PVCO002OCCROWOWM01 <> 0]** in the specific time interval
12	PVCO002ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[PVCO002ALIMINLIH01>0** AND **PVCO002OCCPRESEM01=0]**
13	PVCO002THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
14	PVCO002THCLTHSOH01	Last Time heating system OFF	timestamp			1		The last time the heating system is turned OFF during the whole day.
			TOTALS	**12**	**12**	**13**	**17**	
				54				

Figure 4-14: Corridor #2 - physical measurement and HQDS variables.

	Label	Corridor #5 (to Library)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.28 - Data received by DOKI - Data Transmission = 5 minutes.
1	PVCO003ALILIFLUC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	PVCO003ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour.
3	PVCO003ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative for the installation.
4	PVCO003OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	PVCO003ATIROOTEM01	Room Temperature	°C		1		1	
6	PVCO003ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
7	PVCO003RADMINVEC01	Radiator 1: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
8	PVCO003RADMINVAM01	Radiator 1: Minutes ON	minutes		1		1	Cumulative in the hour
9	PVCO003RADHOUVAM01	Radiator 1: Hours ON	hours		1		1	Cumulative from the installation
10	PVCO003RADMINVEC02	Radiator 2: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
11	PVCO003RADMINVAM02	Radiator 2: Minutes ON	minutes		1		1	Cumulative in the hour
12	PVCO003RADHOUVAM02	Radiator 2: Hours ON	hours		1		1	Cumulative from the installation
13	PVCO003RADPIDORC01	Radiators: Control signal	%		1		1	**PID < 33% R1 & R2 = OFF; 34% < PID < 66% R1 = ON & R2 = OFF; PID > 66% R1 & R2 ON**
14	PVCO003WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
15	PVCO003OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
16	PVCO003RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve 1. **It is used by IES only for calibrating the building model.**
17	PVCO003RADTHRADS02	Threshold Radiator 2	°C		1		1	Set-Point to switch ON/OFF Valve 2. **It is used by IES only for calibrating the building model.**
18	PVCO003ALIWAITIT01	Waiting Time	minutes		1		1	time delay to switch OFF the lights with no presence.**Used by IES only for calibrating the building 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	PVCO003ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **PVCO003ALIMINLIM01** in the specific time interval
2	PVCO003ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **PVCO003ATIROOTEM01** in the specific time interval
3	PVCO003ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **PVCO003ATIROOTES01** in the specific time interval.
4	PVCO003OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	Averaged value [Number of events **PVCO003OCCPRESEM01>0**] *** 5 [minutes]**
5	PVCO003RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	3	ABS (last value - first value) of **PVCO003RADMINVAM01** in the specific time interval
6	PVCO003RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	3	ABS (last value - first value) of **PVCO003RADMINVAM02** in the specific time interval
7	PVCO003WINWIOPEH01	Windows Opened	minutes	1	1	1	3	[Number of events that **PVCO003WINWIOPEM01 > 0**] * 5 [minutes]
8	PVCO003ALIERGCOH01	Room Lighting Energy Consumption	kWh	1	1	1		**[PVCO003ALIMINLIH01 * TotalWatt]/1000; TotalWatt (1 x 24 x 60W) = 1440 [Watt]**
9	PVCO003THCENRGYH01	Room Thermal Energy Consumption	kWh	1	1	1		**[(PVCO003RADMINVAM01 + PVCO003RADMINVAM02) * N.Power]/1000; N.Power = 1488 [Watt]**
10	PVCO003ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		**[PVCO003ATIROOTEH01 > PVCO003OCCPRESEM01]** AND **[PVCO003RADMINVAH01>0 OR**
11	PVCO003WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[PVCO003WINWIOPEH01>0** AND (**PVCO003RADMINVAH01>0 OR PVCO003RADMINVAH02>0)]**
12	PVCO003OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		**[PVCO003OCCROWOWM01 <> 0]** in the specific time interval
13	PVCO003ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[PVCO003ALIMINLIH01>0** AND **PVCO003OCCPRESEM01=0]**
14	PVCO003THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
15	PVCO003THCLTHSOH01	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 4-15: Corridor #5 - physical measurement and HQDS variables.

	Label	Lobby #1	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.23 - Data received by DOKI - Data Transmission = 5 minutes.
1	PVLO001ALILIFLUC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	PVLO001ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour.
3	PVLO001ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative for the installation.
4	PVLO001OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	PVLO001ATIROOTEM01	Room Temperature	°C		1		1	
6	PVLO001ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
7	PVLO001RADMINVEC01	Radiator 1: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
8	PVLO001RADMINVAM01	Radiator 1: Minutes ON	minutes		1		1	Cumulative in the hour
9	PVLO001RADHOUVAM01	Radiator 1: Hours ON	hours		1		1	Cumulative from the installation
10	PVLO001RADMINVEC02	Radiator 2: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
11	PVLO001RADMINVAM02	Radiator 2: Minutes ON	minutes		1		1	Cumulative in the hour
12	PVLO001RADHOUVAM02	Radiator 2: Hours ON	hours		1		1	Cumulative from the installation
13	PVLO001RADMINVEC03	Radiator 3: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
14	PVLO001RADMINVAM03	Radiator 3: Minutes ON	minutes		1		1	Cumulative in the hour
15	PVLO001RADHOUVAM03	Radiator 3: Hours ON	hours		1		1	Cumulative from the installation
16	PVLO001RADPIDORC01	Radiators: Control signal	%		1		1	**PID<25% Rads = OFF; 25%<PID<50% R1=ON; 50%<PID<75% R1+R2=ON; PID>75% Rads = ON.**
17	PVLO001WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
18	PVLO001OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
19	PVLO001RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve 1. **It is used by IES only for calibrating the building model.**
20	PVLO001RADTHRADS02	Threshold Radiator 2	°C		1		1	Set-Point to switch ON/OFF Valve 2. **It is used by IES only for calibrating the building model.**
21	PVLO001RADTHRADS03	Threshold Radiator 3	°C		1		1	Set-Point to switch ON/OFF Valve 3. **It is used by IES only for calibrating the building model.**
22	PVLO001ALIWAITIT01	Waiting Time	minutes		1		1	time delay to switch OFF the lights with no presence.**Used by IES only for calibrating the building model.**
				6	**16**	**0**	**22**	

N	HQDS; High Quality Data Set			15'	hour	Day	QI	
1	PVLO001ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **PVLO001ALIMINLIM01** in the specific time interval
2	PVLO001ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **PVLO001ATIROOTEM01** in the specific time interval
3	PVLO001ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **PVLO001ATIROOTES01** in the specific time interval.
4	PVLO001OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	Averaged value [Number of events **PVLO001OCCPRESEM01>0] * 5 [minutes]**, in the time interval
5	PVLO001RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	3	ABS (last value - first value) of **PVLO001RADMINVAM01** in the specific time interval
6	PVLO001RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	3	ABS (last value - first value) of **PVLO001RADMINVAM02** in the specific time interval
7	PVLO001RADMINVAH03	Radiators: Minutes ON Valve 3	minutes	1	1	1	3	ABS (last value - first value) of **PVLO001RADMINVAM03** in the specific time interval
8	PVLO001WINWIOPEH01	Windows Opened	minutes	1	1	1	3	[Number of events that **PVLO001WINWIOPEM01 > 0**] * 5 [minutes], in the specific time interval
9	PVLO001ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**[PVLO001ALIMINLIH01 * TotalWatt]/1000; TotalWatt (6 x 1 x 40) = 240 [Watt]**
10	PVLO001THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[(PVLO001RADMINVAM01+PVLO001RADMINVAM02+PVLO001RADMINVAM03) * 3685 [Watt]]/1000;**
11	PVLO001ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		**[PVLO001ATIROOTEH01 > PVLO001OCCPRESEM01]** AND **[PVLO001RADMINVAH0x>0]**, x = 1, 2, 3
12	PVLO001WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[PVLO001WINWIOPEH01>0** AND **[PVLO001RADMINVAH0x>0]**, x = 1, 2, 3
13	PVLO001OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		**[PVLO001OCCROWOWM01 <> 0]** in the specific time interval
14	PVLO001ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[PVLO001ALIMINLIH01>0** AND **PVLO001OCCPRESEM01=0]**
15	PVLO001THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
16	PVLO001THCLTHSOH01	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 4-16: Lobby #1 - physical measurement and HQDS variables.

	Label	Lobby #2	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.24 - Data received by DOKI - Data Transmission = 5 minutes.
1	PVLO002ALILIFLUC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	PVLO002ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour.
3	PVLO002ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative for the installation.
4	PVLO002OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	PVLO002ATIROOTEM01	Room Temperature	°C		1		1	
6	PVLO002ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
7	PVLO002RADMINVEC01	Radiator: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
8	PVLO002RADMINVAM01	Radiator: Minutes ON	minutes		1		1	Cumulative in the hour
9	PVLO002RADHOUVAM01	Radiator: Hours ON	hours		1		1	Cumulative from the installation
10	PVLO002RADPIDORC01	Radiator: Control signal	%		1		1	**Control signal: < 50% R1 = OFF; > 50% R1 = ON**
11	PVLO002WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
12	PVLO002OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
13	PVLO002RADTHRADS01	Threshold Radiator	°C		1		1	Set-Point to switch ON/OFF Valve 1. **It is used by IES only for calibrating the building model.**
14	PVLO002ALIWAITIT01	Waiting Time	minutes		1		1	time delay to switch OFF the lights with no presence. **Ued by IES only for calibrating the building model.**
				4	**10**	**0**	**14**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	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	PVLO002ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **PVLO002ALIMINLIM01** in the specific time interval
2	PVLO002ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **PVLO0021ATIROOTEM01** in the specific time interval
3	PVLO002ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **PVLO002ATIROOTES01** in the specific time interval.
4	PVLO002OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	Averaged value [Number of events **PVLO002OCCPRESEM01>0**] *** 5 [minutes]**, in the time interval
5	PVLO002RADMINVAH01	Radiators: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **PVLO002RADMINVAM01** in the specific time interval
6	PVLO002WINWIOPEH01	Windows Opened	minutes	1	1	1	3	[Number of events that **PVLO002WINWIOPEM01 > 0**] * 5 [minutes], in the specific time interval
7	PVLO002ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**[PVLO002ALIMINLIH01 * TotalWatt]/1000; TotalWatt = (2 x 1 x 40) = 80 [Watt]**
8	PVLO002THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[PVLO002RADMINVAM01 * N.Power]/1000]; N.Power = 2090 [Watt]**
9	PVLO002ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		**[PVLO002ATIROOTEH01 > PVLO002OCCPRESEM01]** AND **[PVLO002RADMINVAH01>0]**
10	PVLO002WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[PVLO002WINWIOPEH01>0** AND **PVLO002RADMINVAH01>0]**
11	PVLO002OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		**[PVLO002OCCROWOWM01 <> 0]** in the specific time interval
12	PVLO002ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[PVLO002ALIMINLIH01>0** AND **PVLO002OCCPRESEM01=0]**
13	PVLO002THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
14	PVLO002THCLTHSOH01	Last Time heating system OFF	timestamp			1		The last time the heating system is turned OFF during the whole day.
			TOTALS	**12**	**12**	**13**	**17**	
				54				

Figure 4-17: Lobby #2 - physical measurement and HQDS variables.

	Label	WC #1 (Woman)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.26 - Data received by DOKI - Data Transmission = 5 minutes.
1	PVWC001ALILIFLUC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	PVWC001ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour.
3	PVWC001ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative for the installation.
4	PVWC001OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	PVWC001ATIROOTEM01	Room Temperature	°C		1		1	
6	PVWC001ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
7	PVWC001RADMINVEC01	Radiator 1: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
8	PVWC001RADMINVAM01	Radiator 1: Minutes ON	minutes		1		1	Cumulative in the hour
9	PVWC001RADHOUVAM01	Radiator 1: Hours ON	hours		1		1	Cumulative from the installation
10	PVWC001RADMINVEC02	Radiator 2: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
11	PVWC001RADMINVAM02	Radiator 2: Minutes ON	minutes		1		1	Cumulative in the hour
12	PVWC001RADHOUVAM02	Radiator 2: Hours ON	hours		1		1	Cumulative from the installation
13	PVWC001RADPIDORC01	Radiators: Control signal	%		1		1	**PID < 33% R1 & R2 = OFF; 34% < PID < 66% R1 = ON & R2 = OFF; PID > 66% R1 & R2 ON**
14	PVWC001WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
15	PVWC001OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
16	PVWC001RADTHRADS01	Threshold Radiator 1	%		1		1	Set-Point to switch ON/OFF Valve 1. **It is used by IES only for calibrating the building model.**
17	PVWC001RADTHRADS02	Threshold Radiator 2	%		1		1	Set-Point to switch ON/OFF Valve 2. **It is used by IES only for calibrating the building model.**
18	PVWC001ALIWAITIT01	Waiting Time	minutes		1		1	time delay to switch OFF the lights with no presence. **Used by IES only for calibrating the building 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	PVWC001ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **PVWC001ALIMINLIM01** in the specific time interval
2	PVWC001ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **PVWC001ATIROOTEM01** in the specific time interval
3	PVWC001ATISPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **PVWC001ATIROOTES01** in the specific time interval.
4	PVWC001OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	Averaged value [Number of events **PVWC001OCCPRESEM01>0**] *** 5 [minutes]**, in the time interval
5	PVWC001RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	3	ABS (last value - first value) of **PVWC001RADMINVAM01** in the specific time interval
6	PVWC001RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	3	ABS (last value - first value) of **PVWC001RADMINVAM02** in the specific time interval
7	PVWC001WINWIOPEH01	Windows Opened	minutes	1	1	1	3	[Number of events that **PVWC001WINWIOPEM01 > 0] * 5 [minutes]**, in the specific time interval
8	PVWC001ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**[PVWC001ALIMINLIH01 * TotalWatt]/1000; TotalWatt = (1 x 60W) = 60 [Watt]**
9	PVWC001THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[(PVWC001RADMINVAM01 + PVWC001RADMINVAM02) * N.Power]/1000; N.Power = 755 [Watt]**
10	PVWC001ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		**[PVWC001ATIROOTEH01 > PVWC001OCCPRESEM01]** AND [**PVWC001RADMINVAH01>0** OR **PVWC001RADMINVAH02>0**]
11	PVWC001WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[PVWC001WINWIOPEH01>0** AND (**PVWC001RADMINVAH01>0 OR PVWC001RADMINVAH02>0)]**
12	PVWC001OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		**[PVWC001OCCROWOWM01 <> 0]** in the specific time interval
13	PVWC001ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[PVWC001ALIMINLIH01>0** AND **PVWC001OCCPRESEM01=0]**
14	PVWC001THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
15	PVWC001THCLTHSOH01	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 4-18: WC #1 (Woman) - physical measurement and HQDS variables.

	Label	WC #2 (Man)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.27 - Data received by DOKI - Data Transmission = 5 minutes.
1	PVWC002ALILIFLUC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	PVWC002ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour.
3	PVWC002ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative for the installation.
4	PVWC002OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	PVWC002ATIROOTEM01	Room Temperature	°C		1		1	
6	PVWC002ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
7	PVWC002RADMINVEC01	Radiator: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
8	PVWC002RADMINVAM01	Radiator: Minutes ON	minutes		1		1	Cumulative in the hour
9	PVWC002RADHOUVAM01	Radiator: Hours ON	hours		1		1	Cumulative from the installation
10	PVWC002RADPIDORC01	Radiator: Control signal	%		1		1	**Control signal: < 50% R1 = OFF; > 50% R1 = ON**
11	PVWC002WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
12	PVWC002OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
13	PVWC002RADTHRADS01	Threshold Radiator 1	%		1		1	Set-Point to switch ON/OFF Valve 1. **It is used by IES only for calibrating the building model.**
14	PVWC002ALIWAITIT01	Waiting Time	minutes		1		1	time delay to switch OFF the lights with no presence. **Used by IES only for calibrating the building model.**
				4	**10**	**0**	**14**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	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	PVWC002ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **PVWC002ALIMINLIM01** in the specific time interval
2	PVWC002ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **PVWC002ATIROOTEM01** in the specific time interval
3	PVWC002ATISPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **PVWC002ATIROOTES01** in the specific time interval.
4	PVWC002OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	Averaged value [Number of events **PVWC002OCCPRESEM01>0**] *** 5 [minutes]**, in the time interval
5	PVWC002RADMINVAH01	Radiators: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **PVWC002RADMINVAM01** in the specific time interval
6	PVWC002WINWIOPEH01	Windows Opened	minutes	1	1	1	3	[Number of events that **PVWC002WINWIOPEM01 > 0] * 5 [minutes]**, in the specific time interval
7	PVWC002ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**[PVWC002ALIMINLIH01 * TotalWatt]/1000; TotalWatt = (1 x 60W) = 60 [Watt]**
8	PVWC002THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[PVWC002RADMINVAM01 * N.Power]/1000; N.Power = 755 [Watt]**
9	PVWC002ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		**[PVWC002ATIROOTEH01 > PVWC002OCCPRESEM01]** AND **[PVWC001RADMINVAH01>0]**
10	PVWC002WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		**[PVWC002WINWIOPEH01>0** AND **PVWC002RADMINVAH01>0]**
11	PVWC002OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		**[PVWC002OCCROWOWM01 <> 0]** in the specific time interval
12	PVWC002ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		**[PVWC002ALIMINLIH01>0** AND **PVWC002OCCPRESEM01=0]**
13	PVWC002THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
14	PVWC002THCLTHSOH01	Last Time heating system OFF	timestamp			1		The last time the heating system is turned OFF during the whole day.
			TOTALS	**12**	**12**	**13**	**17**	
				54				

Figure 4-19: WC #2 (Man) - physical measurement and HQDS variables.

	Label	Meteo data	Unit	Dig	Ang	SW	TOTAL	EVO (control module) IP address: 10.0.1.31 - Data received by DOKI - Data Transmission = 5 minutes.
1	LEPILOTATEEXTTEM01	External Temperature	°C		1		1	Sensor installed on the first window of Corridor #1 (entrance from Lobby #1). Sensor connect to the control module of "Pilot: Electrical Measurement #2"
				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	**1**	**1**	**1**	**3**	
				6				

	Label	School: Electrical and Thermal Networks	Unit	Dig	Ang	SW	TOTAL	EVO (control module) IP address: 10.0.1.29 - Data received by DOKI - Data Transmission = 5 minutes. Remarks: Electrical meter located at the Ground Floor. Thermal meter located in the Boiler House.
1	PVPS001ELCENRGYM01	Electrical Energy (Active)	kWh		1		**1**	Cumulative from the installation
2	PVPS001ELCPOWERM01	Electrical Power (Active)	Watt		1		**1**	
3	PVPS001ELCRERGYM01	Reactive Energy	KVarh		1		**1**	Cumulative from the installation.
4	PVPS001ELCROWERM01	Reactive Power	Kvar		1		**1**	
5	PVPS001ELCAMPERM01	Electrical Current: Phase 1	Ampere		1		**1**	It is used only by IES for calibration of the building model
6	PVPS001ELCAMPERM02	Electrical Current: Phase 2	Ampere		1		**1**	It is used only by IES for calibration of the building model
7	PVPS001ELCAMPERM03	Electrical Current: Phase 3	Ampere		1		**1**	It is used only by IES for calibration of the building model
8	PVPS001ELCVOLTAM01	Voltage: Phase1	Volt		1		**1**	It is used only by IES for calibration of the building model
9	PVPS001ELCVOLTAM02	Voltage: Phase2	Volt		1		**1**	It is used only by IES for calibration of the building model
10	PVPS001ELCVOLTAM03	Voltage: Phase3	Volt		1		**1**	It is used only by IES for calibration of the building model
11	PVPS001THCENRGYM01	Thermal Energy Consumption	kWh	1			**1**	**1 pulse = 1 [kWh]. Cumulative from the start.**
				1	**10**	**0**	**11**	

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	**PVPS001ELCENRGYH01**	Electricity Consumption	kWh	1	1	1	**3**	(last value - first value) of **PVPS001ELCENRGYM01** in the specific time interval. Active Energy
2	**PVPS001ELCPOWERH01**	Electrical Power	Watt	1	1	1	**3**	Average among all value of **PVPS001ELCPOWERM01** in the specific time interval. Active Power
3	**PVPS001ELCROWERH02**	Reactive Eenergy	KVarh	1	1	1	**3**	(last value - first value) of **PVPS001ELCRERGYM01** in the specific time interval
4	**PVPS001ELCROWERH01**	Reactive Power	Kvar	1	1	1	**3**	average among all values of **PVPS001ELCROWERM01** in the specific time interval
5	**PVPS001THCENRGYH01**	Thermal Energy Consumption	kWh	1	1	1	**3**	ADD **PVPS001THCENRGYM01** over time intervals
6	**PVPS001ELCPOMAXH01**	MAX Electrical Power	Watt			1		MAX among all value of **PVPS001ELCPOWERM01** in the specific time interval
7	**PVPS001ELCROMAXH01**	MAX Reactive Electrical Power	Kvar			1		MAX among all value of **PVPS001ELCROWERM01** in the specific time interval
8	**PVPS001ELCENRPKH01**	Ele Consumption: Peak Hours	kWh			1		To be calculated daily
9	**PVPS001ELCENOPKH01**	EleConsumption: OFF Peak Hours	kWh			1		To be calculated daily
10	**PVPS001ELCTOKPIH01**	Electricity Consumption Indicator	kWh/m²			1		To be calculated (daily) by VSN: **[PVPS001ELCENRGYH01]/[School.surface]**
11	**PVPS001ELCLIKPIH01**	Thermal Energy Indicator	kWh/m²			1		To be calculated by (daily) VSN: **[PVPS001THCENRGYH01]/[School.surface]**
			TOTALS	**5**	**5**	**11**	**15**	
				36				

Figure 4-20: Meteo and School Networks - physical measurement and HQDS variables.

	Label	Pilot: Electrical Measurement #1	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.30 - Data received by DOKI - Data Transmission = 5 minutes. Meter #1, located on Corridor #1 (entrance)
1	PVPP001ELCENRGYM01	Electricity Consumption	kWh		1		1	Cumulative from the installation
2	PVPP001ELCPOWERM01	Electrical Power (Active)	Watt		1		1	
3	PVPP001ELCRERGYM01	Reactive Energy	KVarh		1		1	Cumulative from the installation.
4	PVPP001ELCROWERM01	Reactive Power	KVarh		1		1	
5	PVPP001ELCAMPERM01	Electrical Current: Phase 1	Ampere		1		1	It is used only by IES for calibration of the building model
6	PVPP001ELCAMPERM02	Electrical Current: Phase 2	Ampere		1		1	It is used only by IES for calibration of the building model
7	PVPP001ELCAMPERM03	Electrical Current: Phase 3	Ampere		1		1	It is used only by IES for calibration of the building model
8	PVPP001ELCVOLTAM01	Voltage: Phase1	Volt		1		1	It is used only by IES for calibration of the building model
9	PVPP001ELCVOLTAM02	Voltage: Phase2	Volt		1		1	It is used only by IES for calibration of the building model
10	PVPP001ELCVOLTAM03	Voltage: Phase3	Volt		1		1	It is used only by IES for calibration of the building model
				0	10	0	10	

	Label	Pilot: Electrical Measurement #2	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.31 - Data received by DOKI - Data Transmission = 5 minutes. Meter #2, located on Corridor #5 (entrance Library)
1	PVPP002ELCENRGYM01	Electricity Consumption	kWh		1		1	Cumulative from the installation
2	PVPP002ELCPOWERM01	Electrical Power (Active)	Watt		1		1	
3	PVPP002ELCRERGYM01	Reactive Energy	KVarh		1		1	Cumulative from the installation.
4	PVPP002ELCROWERM01	Reactive Power	KVarh		1		1	
5	PVPP002ELCAMPERM01	Electrical Current: Phase 1	Ampere		1		1	It is used only by IES for calibration of the building model
6	PVPP002ELCAMPERM02	Electrical Current: Phase 2	Ampere		1		1	It is used only by IES for calibration of the building model
7	PVPP002ELCAMPERM03	Electrical Current: Phase 3	Ampere		1		1	It is used only by IES for calibration of the building model
8	PVPP002ELCVOLTAM01	Voltage: Phase1	Volt		1		1	It is used only by IES for calibration of the building model
9	PVPP002ELCVOLTAM02	Voltage: Phase2	Volt		1		1	It is used only by IES for calibration of the building model
10	PVPP002ELCVOLTAM03	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	PVPP001ELCENRGYH01	Electricity Consumption	kWh	1	1	1	3	[(last - first) value of PVPP001ELCENRGYM01] + [(last - first) value of PVPP002ELCENRGYM01]
2	PVPP001ELCPOWERH01	Electrical Power	Watt	1	1	1	3	[PVPP001ELCPOWERM01 + PVPP002ELCPOWERM01]
3	PVPP001ELCRERGYH01	Reactive Eenergy	KVarh	1	1	1	3	[(last - first) value of [PVPP001ELCRERGYM01] + [(last - first) value of PVPP002ELCRERGYM01]
4	PVPP001ELCROWERH01	Reactive Power	KVarh	1	1	1	3	[PVPP001ELCROWERM01 + PVPP002ELCROWERM01]
5	PVPP001ELCLITOTH01	Lighting Energy Consumption	kWh	1	1	1	3	To be calculated daily: [Sum(PVxxxxxALIERGCLH01)]. All classrooms and environments.
6	PVPP001ELCLILEDH01	Pilot LED Lighting Consumption	kWh	1	1	1	3	To be calculated daily: [PVCL307ALIERGCLH01+PVCL309ALIERGCLH01)] for the 2 rooms with LED lighting
7	PVPP001ELCLILFLUH01	Traditional Lighting Consumption	kWh	1	1	1	3	To be calculated daily: [PVPP001ELCLITOTH01] - [PVPP001ELCLILEDH01]
8	PVPP001ELCLILDIMD01	Lighting Consumption: Dimming	kWh	1	1	1	3	To be calculated daily: [PVCL309ALIERGCLH01]
9	PVPP001ELCLIKPIH01	Lighting Energy Indicator	kWh/m²			1		To be calculated daily: [PVPP001ELCLITOTH01]/[Pilot.surface]
10	PVPP001ELCTOKPIH01	Electrical Energy Indicator	kWh/m²			1		To be calculated daily: [PVPP001ELCENRGYH01]/[School.surface]
11	PVPP001THCHETOTH01	Thermal Energy Consumption	kWh/m²	1	1	1	3	To be calculated daily: [Sum(PVxxxxxTHCENRGYH01)]
12	PVPP001THCHEKPIH01	Thermal Energy Cons. Indicator	kWh/m²			1		To be calculated daily: [PVPP001THCHETOTH01]/[Pilot.surface]
			TOTALS	9	9	12	27	
				57				

Figure 4-21: Pilot & Energy Indicators - physical measurement and HQDS variables.