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DELIVERABLE

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D6.1 Pilots Implementation:
Annex B – GENOA Pilot

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Main Authors: **Paolo Onesti (DOKI)**
Co Authors: **Sara Piana (CDG), Fortunato Billè (CDG), Vincenzo Frisina (CDG)**

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PU	**Public**	**√**
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 B – GENOA Pilot

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

Document Control

Project Coordinator: **AESS** (*Alfio Galatà*)

Work Package Leader: **EAP** (*Liyana Adjarova*)

Task 6.1: Pilot Preparation - Leader: **AESS** (*Stefano Ranuzzini*)

Task 6.2: Pilot Installation - Leader: **DOKI** (Paolo Onesti)

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

File Reference: **D6.1 Annex B – GENOA Pilot**

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V3.1	07/12/2013	Review of the final version	Pon, FBi
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V2.0	30/11/2013	Review Appendix B: GENOA Pilot	FBi, SPi
V1.0	20/11/2013	First document delivered for comments and additional content.	POn

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1. GENOA Pilot

1.1 The site

Genoa (Voltri) School is a recent complex school, located in Voltri, West district of Genoa city and built in 1985. It includes three basic school levels: nursery, primary and junior high school and that during the school year hosts an average of 446 people. The complex is accessible from an internal road with some lay-byes and car park areas. The school has a video room, a library, a computer lab, a drawing room, a lot of class rooms, a big cafeteria, a kitchen, a big and well equipped gymnasium and a medical room.
It is a two building complex: both the buildings consist of three floors plus the ground floor, for a total volume of about 24,000 m^3.

The Building proposed for the VERYSchool project has total area of about 3,030 m^2. **Pilot** area is the first floor and part of the second floor, with a net indoor area of 737 m^2. **Pilot** consist of classrooms, laboratories, offices, library, lobbies, corridors and WC-s. Pilot area hosts approximately 88 people.

Item	BUILDING DATA	PILOT DATA	Item	BUILDING DATA	PILOT DATA
Gross indoor area [m^2]:	3,030	812	Gross indoor volume [m^3]:	9,090	2,436
Net indoor area [m^2]	2,700	737.28	Net indoor volume[m^3]:	8,100	2,211
Number of Building floors:	4	2	Envelope area A [m^2]:	2,880	820
Gross Windows surface [m^2]:	423.07	116,66	Net heated area [m^2]:	2,700	737.28
Gross floor height [m]:	3.20	3.20	Net heated space volume [m^3]:	8,100	2,211
Net floor height [m]:	3.00	3.00	Air- conditioned area [m^2]:	-	-
Total building height [m]:	12	6.4	Air- conditioned space volume [m^3]:	-	-

Building data of Genoa School and Pilot area

The building structure

The Pilot selected area

Windows

1.2 Pilot Area Selection

The Pilot area is on two floors. The ground floor hosts : 4 entrances, Service, Rooms, Medical Room, Stairs, WC, etc.

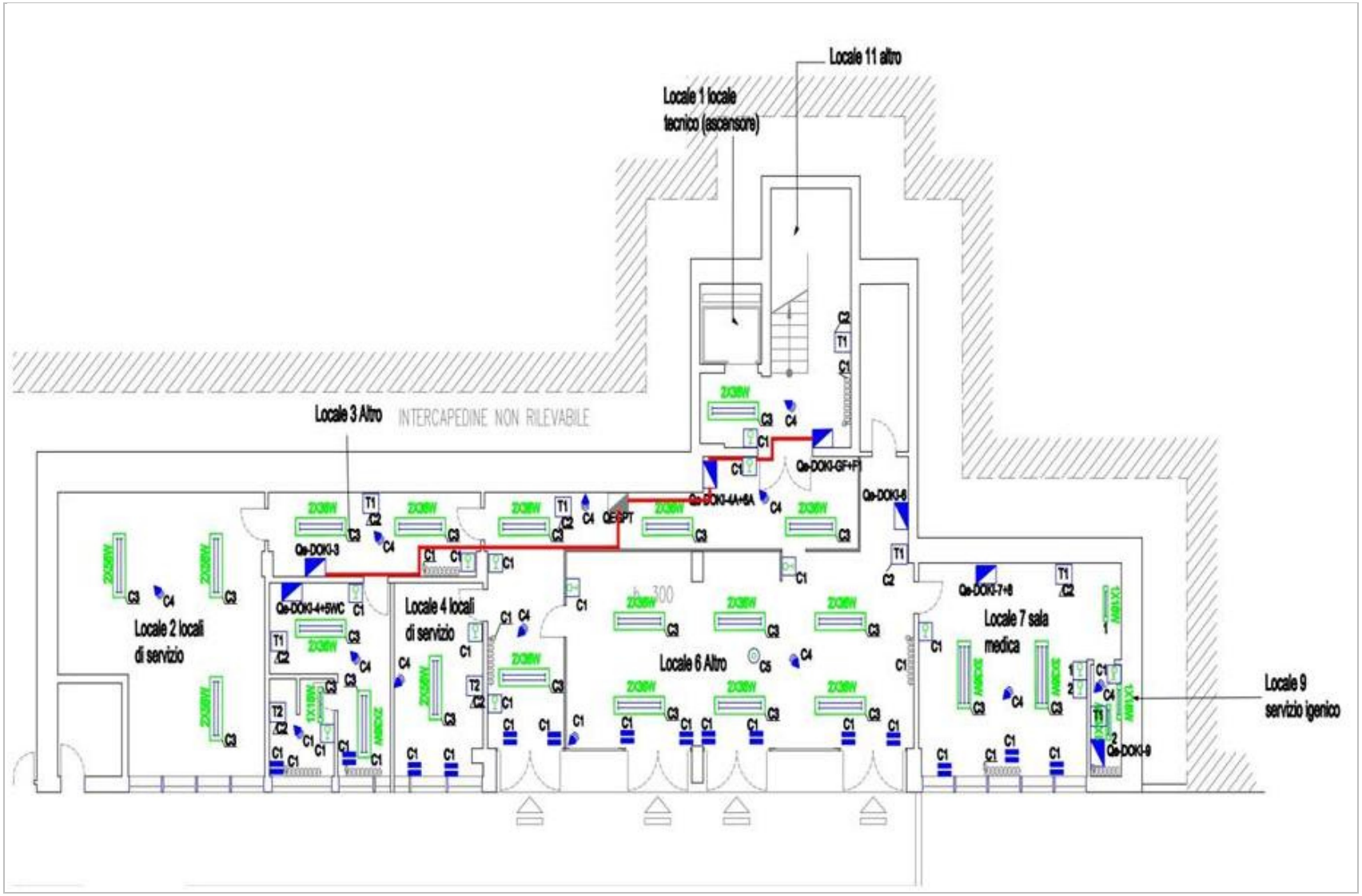


Figure 1-1: Genoa School: Ground floor Rooms and exsisting provisions

The 1st floor hosts Classrooms, WC, Service Rooms, etc.

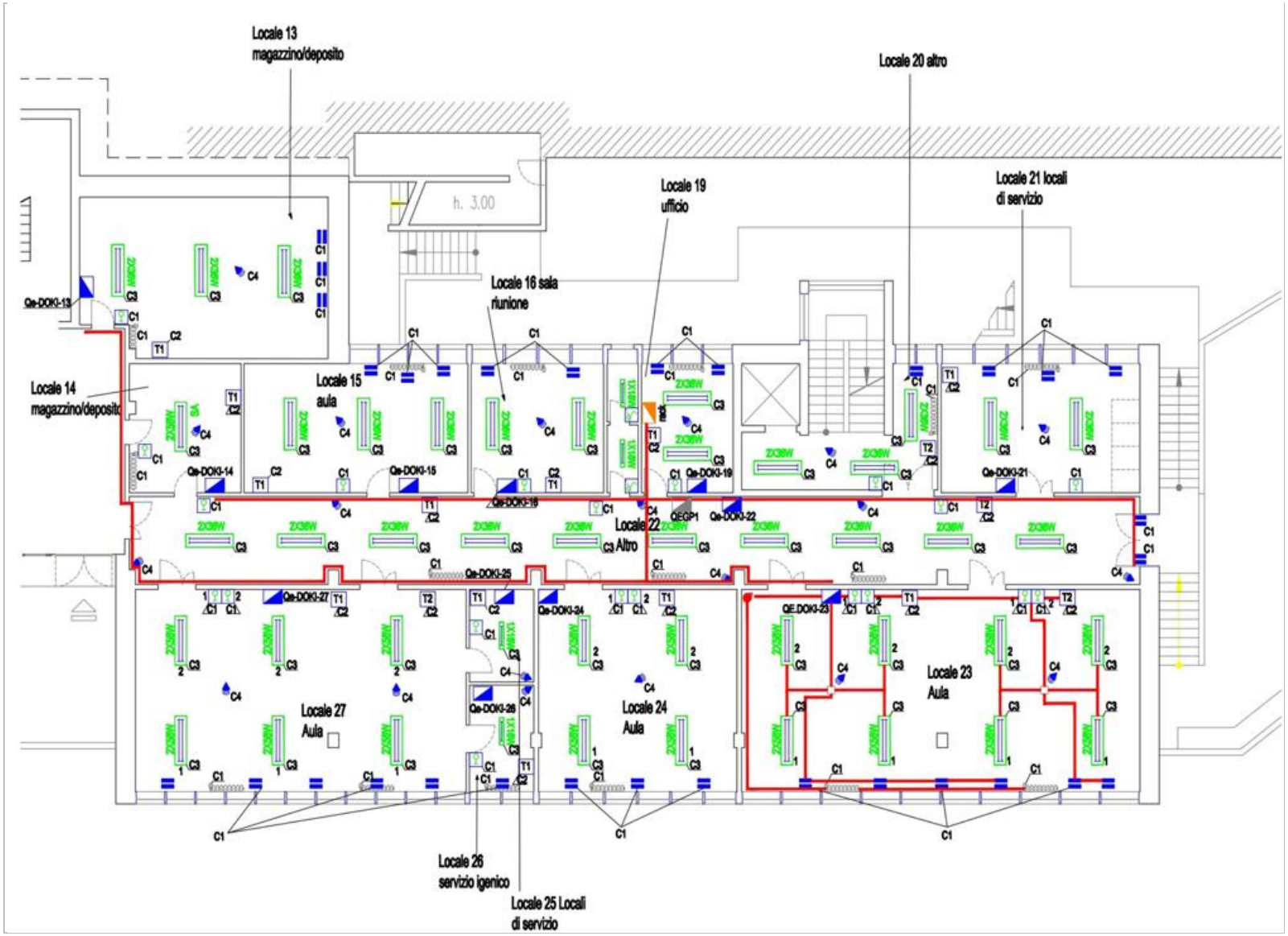
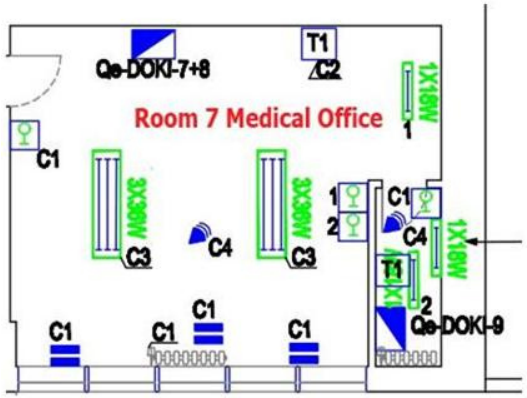


Figure 1-2: Genoa School: 1st floor Rooms and exsisting provisions

Next Figure shows the layout of a generic room, with some details of the BEMS design for that room:



Room detail

Legend:

- **C1**: contacts and switches, like valve switch on the radiator, light switch, windows contact;
- **C2**: temperature sensor
- **C3**: lamps with installed power
- **C4**: presence sensor
- **Qe-DOKI**: EVO Module for room control.

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 detailing drawings, layouts, technical specification of equipment and cabling was produced taking into account that the Pilot installation has been object of a tender to apply the rules of the Genoa Municipality.

More in detail, the whole set of documentation includes:

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

BOX Label	article	Order Code	Incr	BOARD IP	WIFI IP	ID	NAME	NOME FILE	DIP 1	DIP 2	DIP 3	FW
DOKI 01	463300101	330575	19	10.0.1. 11	NONE	11	4+5 WC	GENOA_4+5 WC	97	1	0	2.0.5.18
DOKI 01	463300101	330575	20	10.0.1. 12	NONE	12	4A DRESSING R. + 6A	GENOA_4A SPOGLIATOIO + 6A	97	2	0	2.0.5.18
DOKI 01	463300101	330575	21	10.0.1. 13	NONE	13	6 OTHER ROOM	GENOA_6	97	3	0	2.0.5.18
DOKI 01	463300101	330575	22	10.0.1. 14	NONE	14	20+11 STAIRS	GENOA_VANO SCALA	97	4	0	2.0.5.18
DOKI 01	463300101	330575	23	10.0.1. 15	NONE	15	13 WAREHOUSE	GENOA_13	97	5	0	2.0.5.18
DOKI 01	463300101	330575	24	10.0.1. 16	NONE	16	14 WAREHOUSE	GENOA_14	97	6	0	2.0.5.18
DOKI 01	463300101	330575	25	10.0.1. 17	NONE	17	15 CLASSROOM	GENOA_15	97	7	0	2.0.5.18
DOKI 01	463300101	330575	26	10.0.1. 18	NONE	18	16 MEETING ROOM	GENOA_16	97	8	0	2.0.5.18
DOKI 01	463300101	330575	27	10.0.1. 19	NONE	19	19 OFFICE	GENOA_19	97	9	0	2.0.5.18
DOKI 01	463300101	330575	28	10.0.1. 20	NONE	20	21 SERVICE ROOMS	GENOA_21	97	10	0	2.0.5.18
DOKI 01	463300101	330575	29	10.0.1. 21	NONE	21	22 CORRIDOR	GENOA_22 CORRIDOR	97	11	0	2.0.5.18
DOKI 01	463300101	330575	30	10.0.1. 22	NONE	22	23 CLASSROOM	GENOA_23	97	12	0	2.0.5.18
DOKI 01	463300101	330575	31	10.0.1. 23	NONE	23	24 CLASSROOM	GENOA_24	97	13	0	2.0.5.18
DOKI 01	463300101	330575	32	10.0.1. 24	NONE	24	25 SERVICE ROOM	GENOA_25	97	14	0	2.0.5.18
DOKI 01	463300101	330575	33	10.0.1. 25	NONE	25	26 WC	GENOA_26	97	15	0	2.0.5.18
DOKI 01	463300101	330575	34	10.0.1. 26	NONE	26	27 CLASSROOM	GENOA_27	97	16	0	2.0.5.18
DOKI 01	463300101	330575	35	10.0.1. 27	NONE	27	2 + 3 OTHER ROOMS	GENOA_2 + 3	97	17	0	2.0.5.18
DOKI 01	463300101	330575	36	10.0.1. 28	NONE	28	7 + 8 SERVICE & MED. ROOM	GENOA_7 + 8	97	18	0	2.0.5.18
DOKI 01	463300101	330575	37	10.0.1. 29	NONE	29	9 WC	GENOA_9	97	19	0	2.0.5.18
ENERGY PLANT	463300103	330574	5	10.0.1. 30	NONE	30	THERMAL POWER PLANT 1	GENOA_THERMAL POWER PLANT 1	51	20	3	2.0.6.9
ENERGY PLANT	463300103	330720	1	10.0.1. 31	NONE	31	THERMAL POWER PLANT 2	GENOA_THERMAL POWER PLANT 2	51	21	3	2.0.6.9
ENERGY PLANT	463300103	330357	1	10.0.1. 32	NONE	32	BOILER ROOM	GENOA_CALDAIA	51	22	3	2.0.6.9

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

2. The DOKI BEMS.

2.1 Layouts: control network and Box Control Units

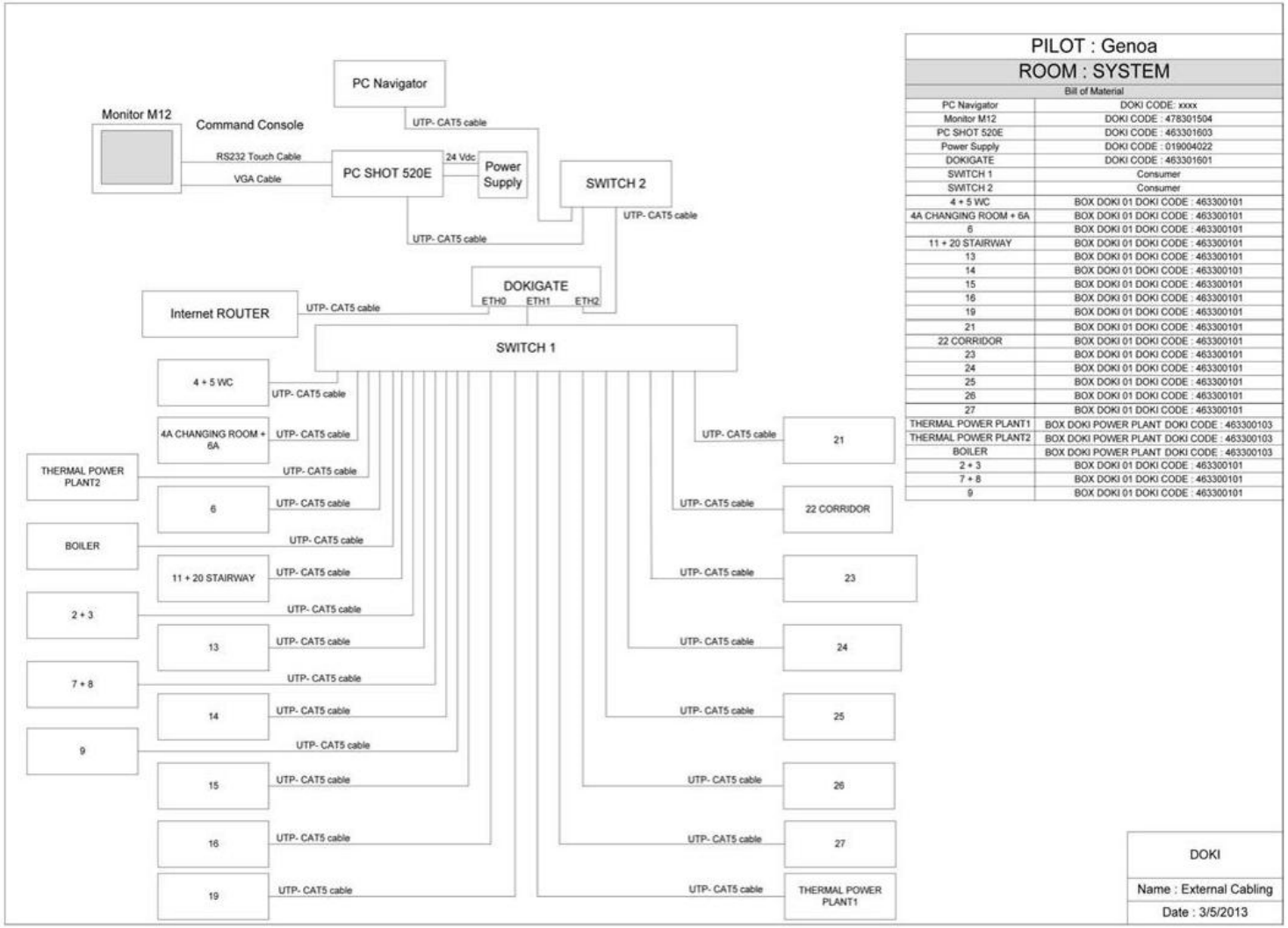


Figure 2-1: Wiring schema – Control Network

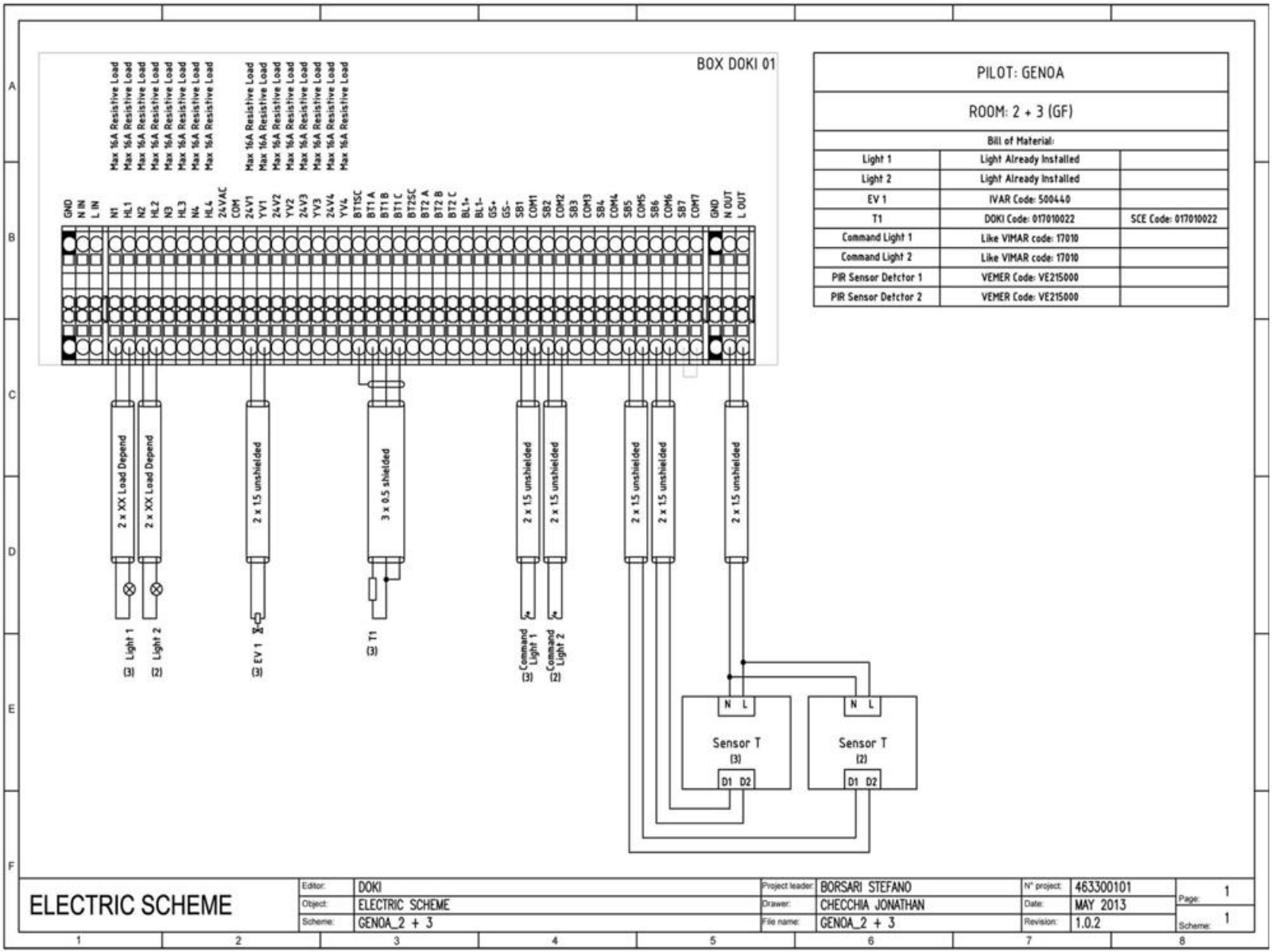


Figure 2-2: Wiring schema - Laundry 2 + Corridor 3 (GF)

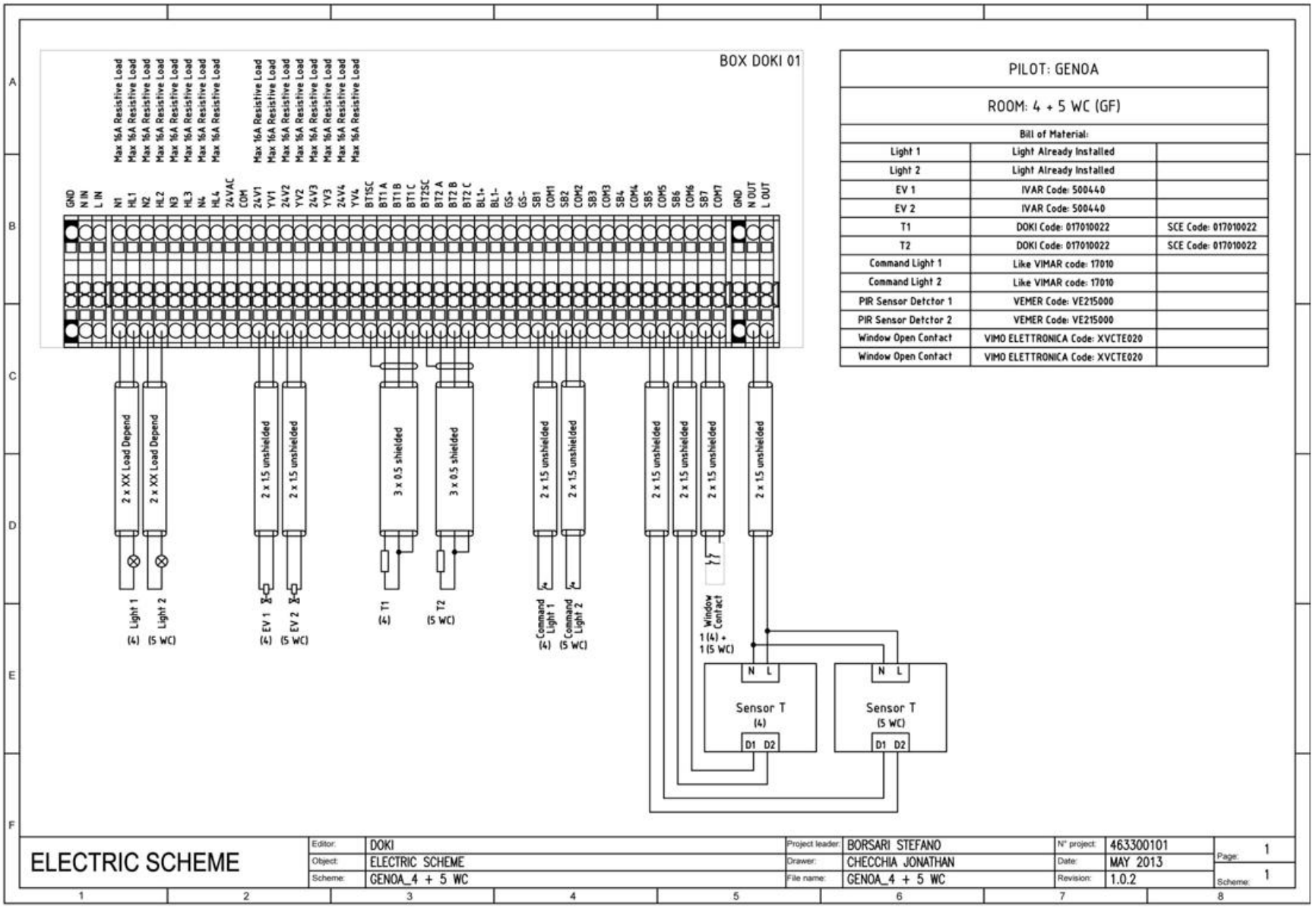


Figure 2-3: Wiring schema - 4 + 5 WC (GF)

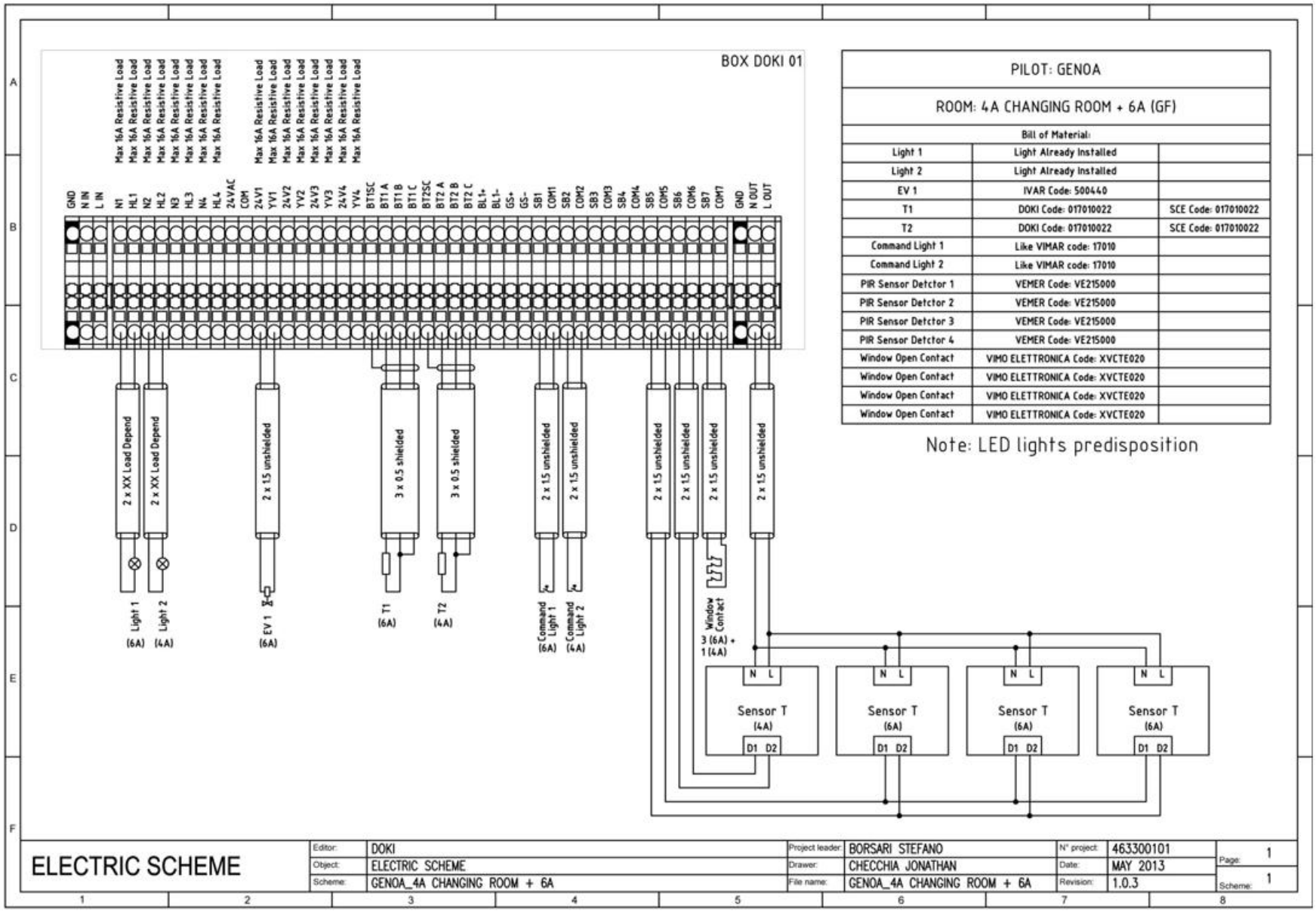


Figure 2-4: Wiring schema - 4A Changing room + Corridor 6A (GF)

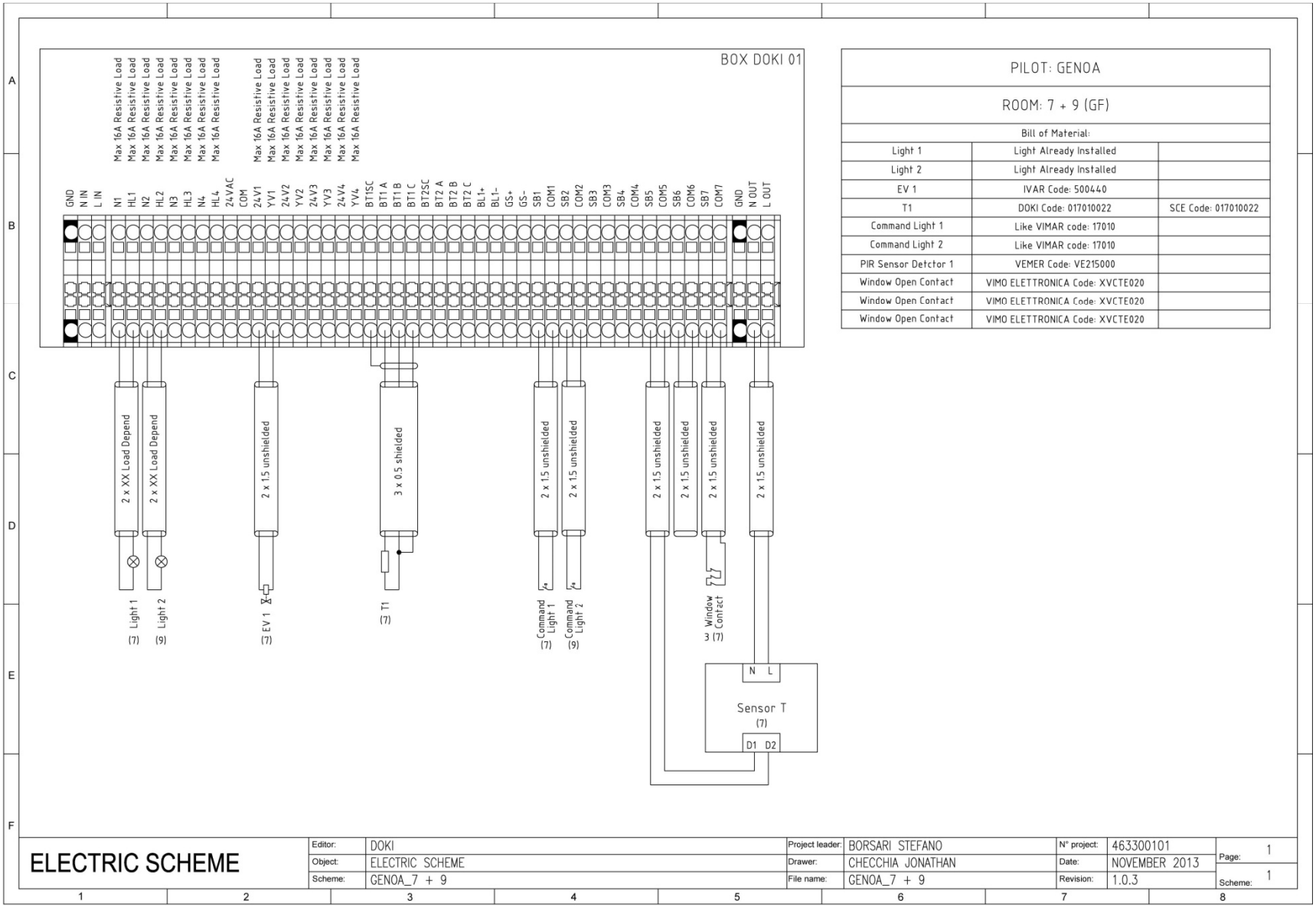


Figure 2-5: Wiring schema - Nursery 7 + 9 (GF)

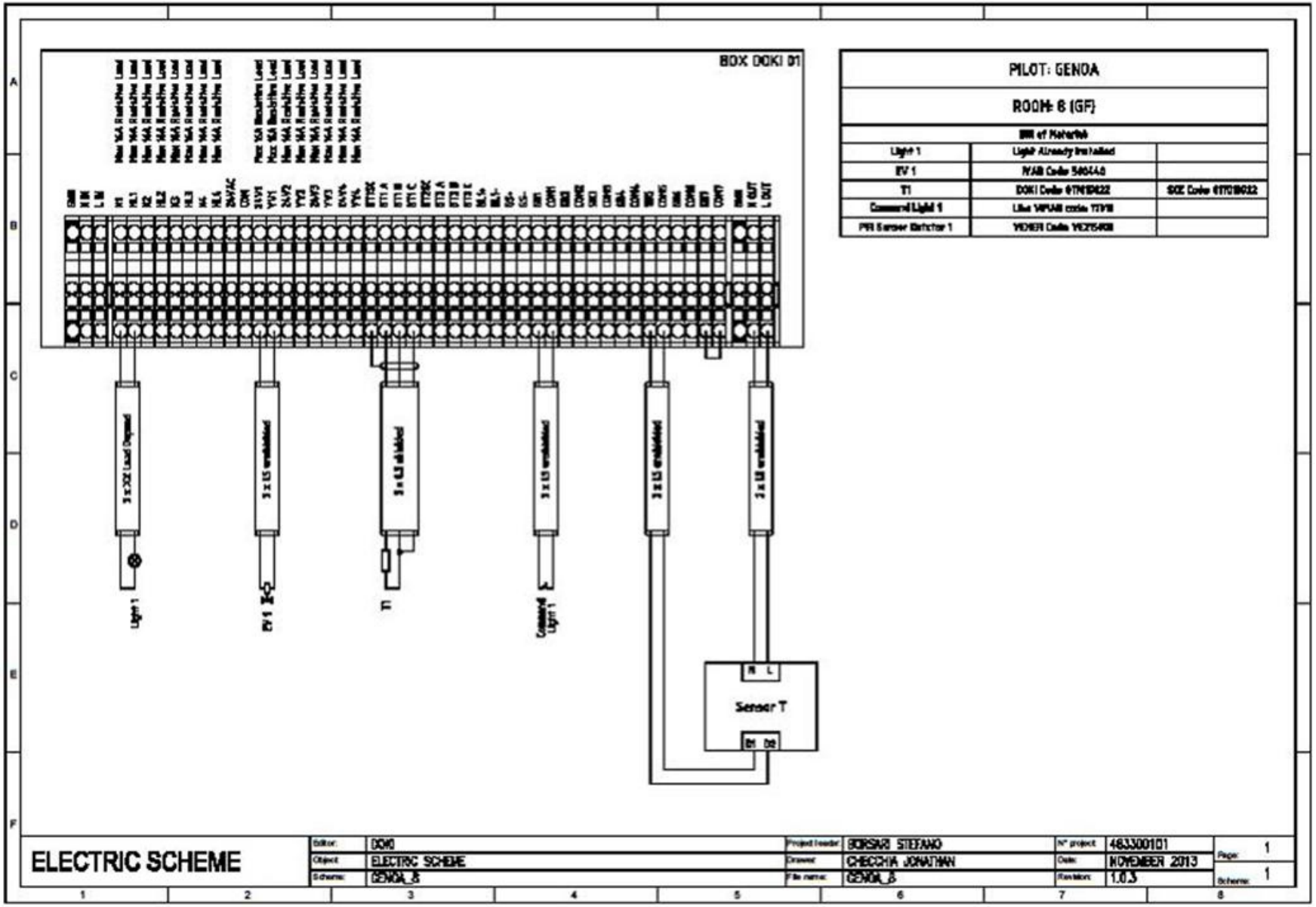


Figure 2-6: Wiring schema - Room 6 (GF)

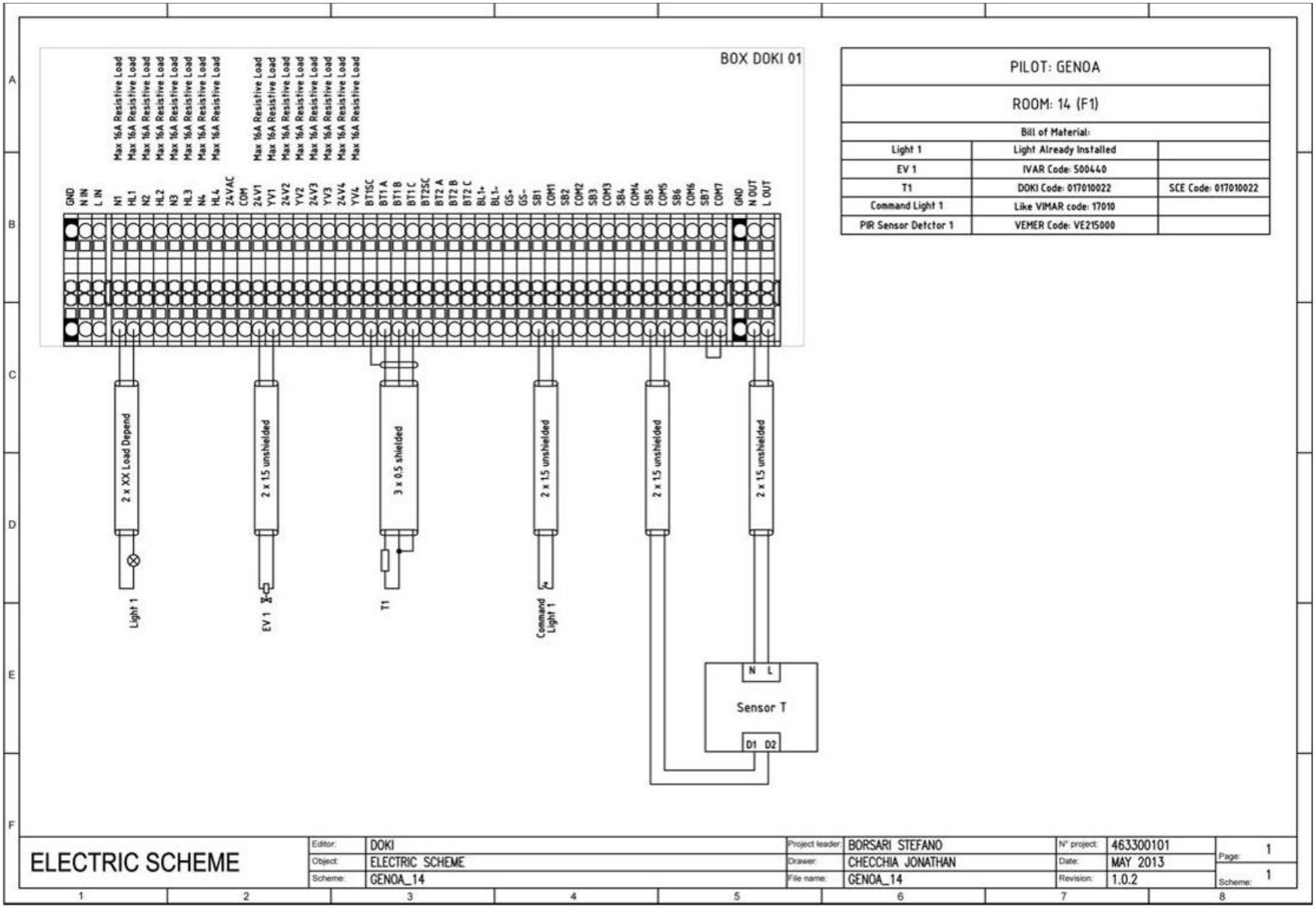


Figure 2-7: Wiring schema - Room 14 (F1)

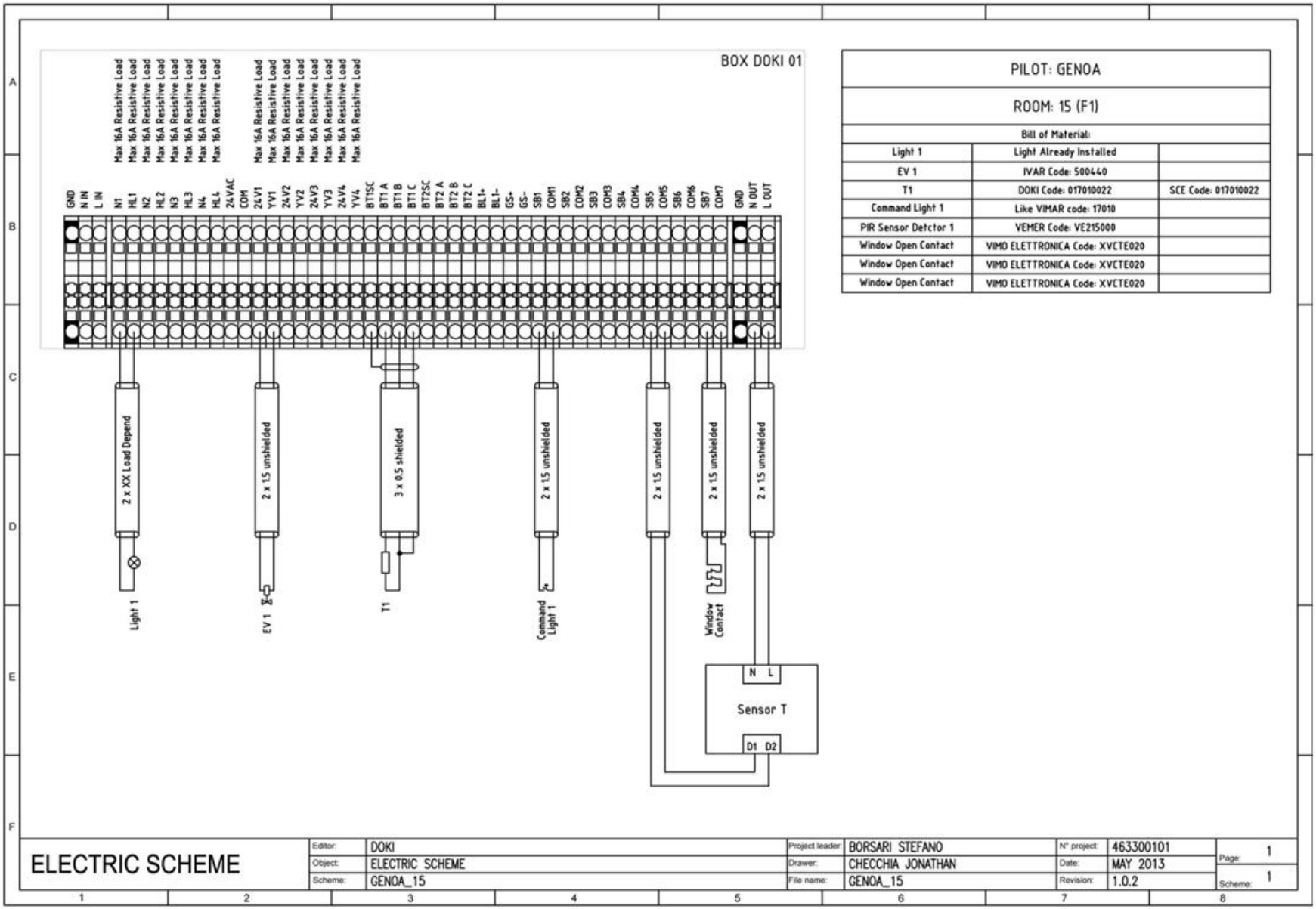


Figure 2-8: Wiring schema - Room 15 (F1)

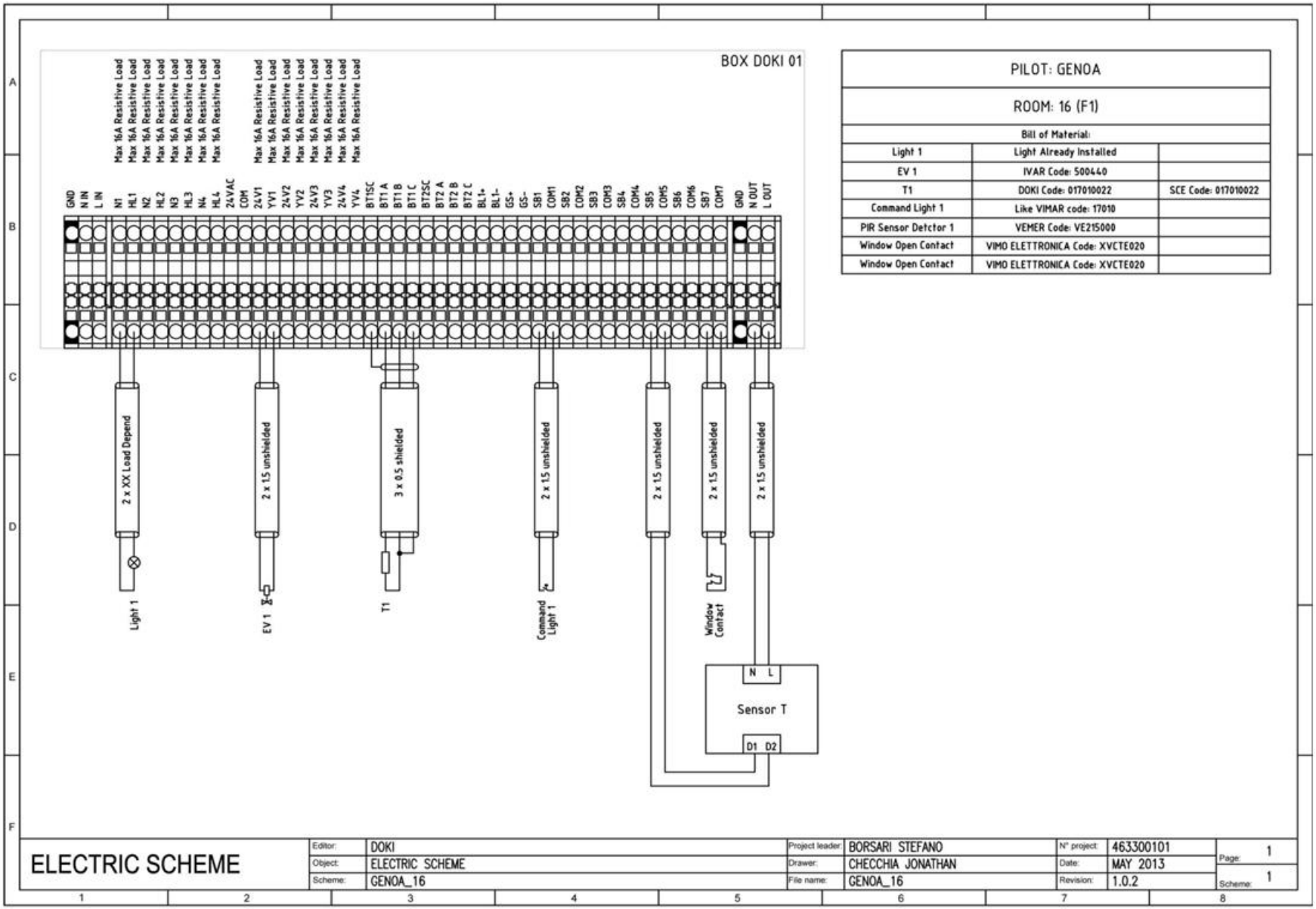


Figure 2-9: Wiring schema - Room 16 (F1)

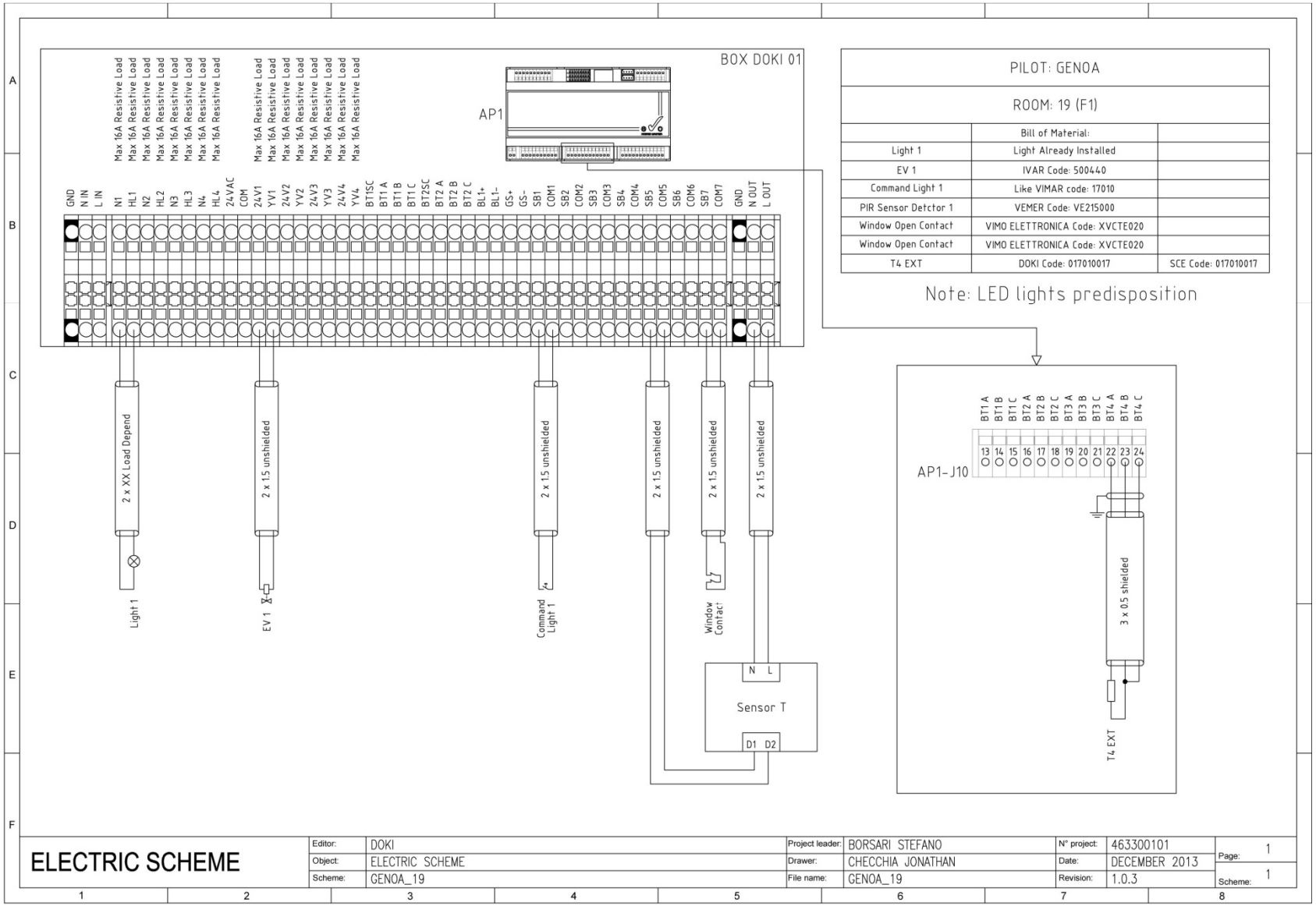


Figure 2-10: Wiring schema - Room 19 (F1)

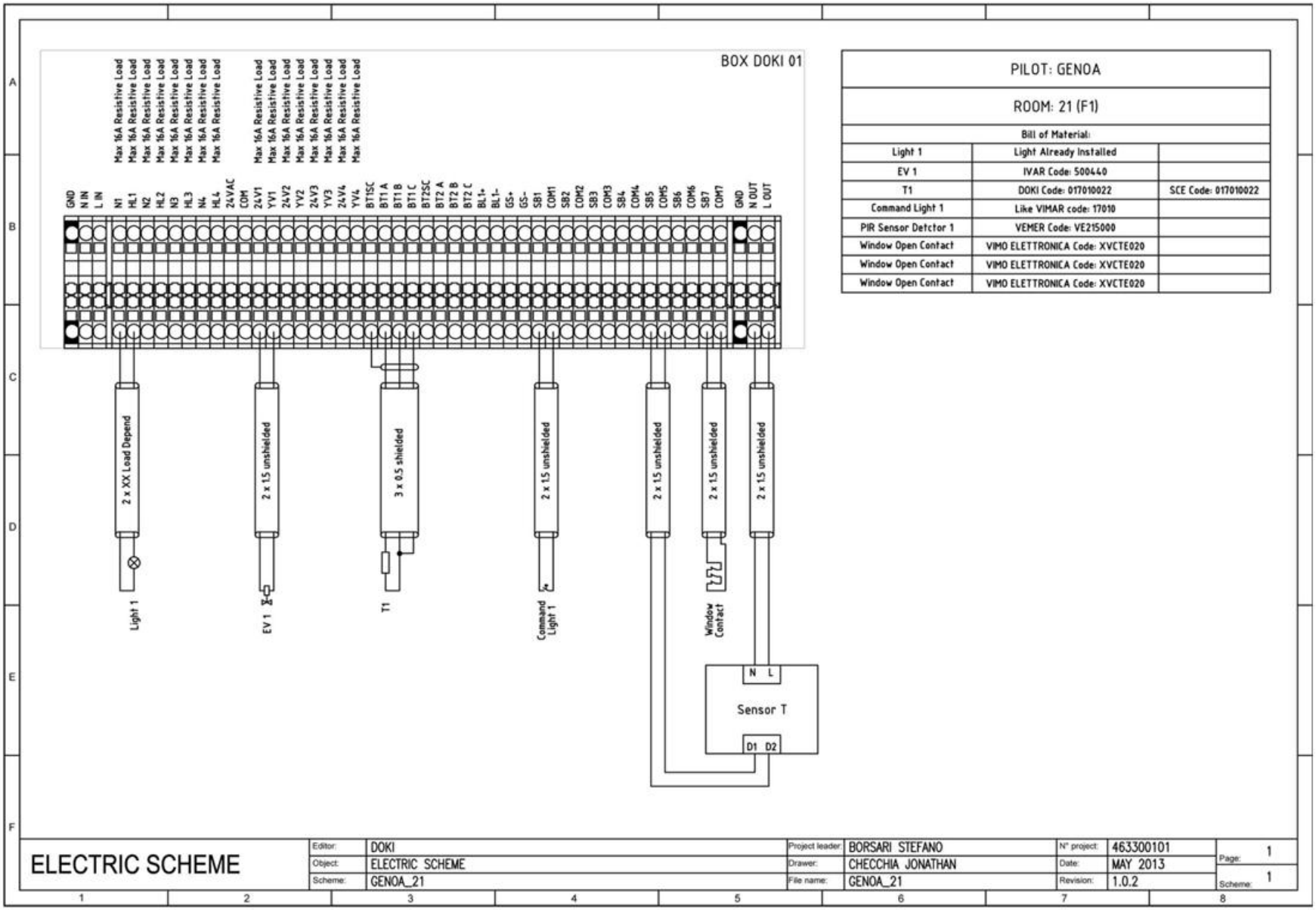


Figure 2-11: Wiring schema - Room 21 (F1)

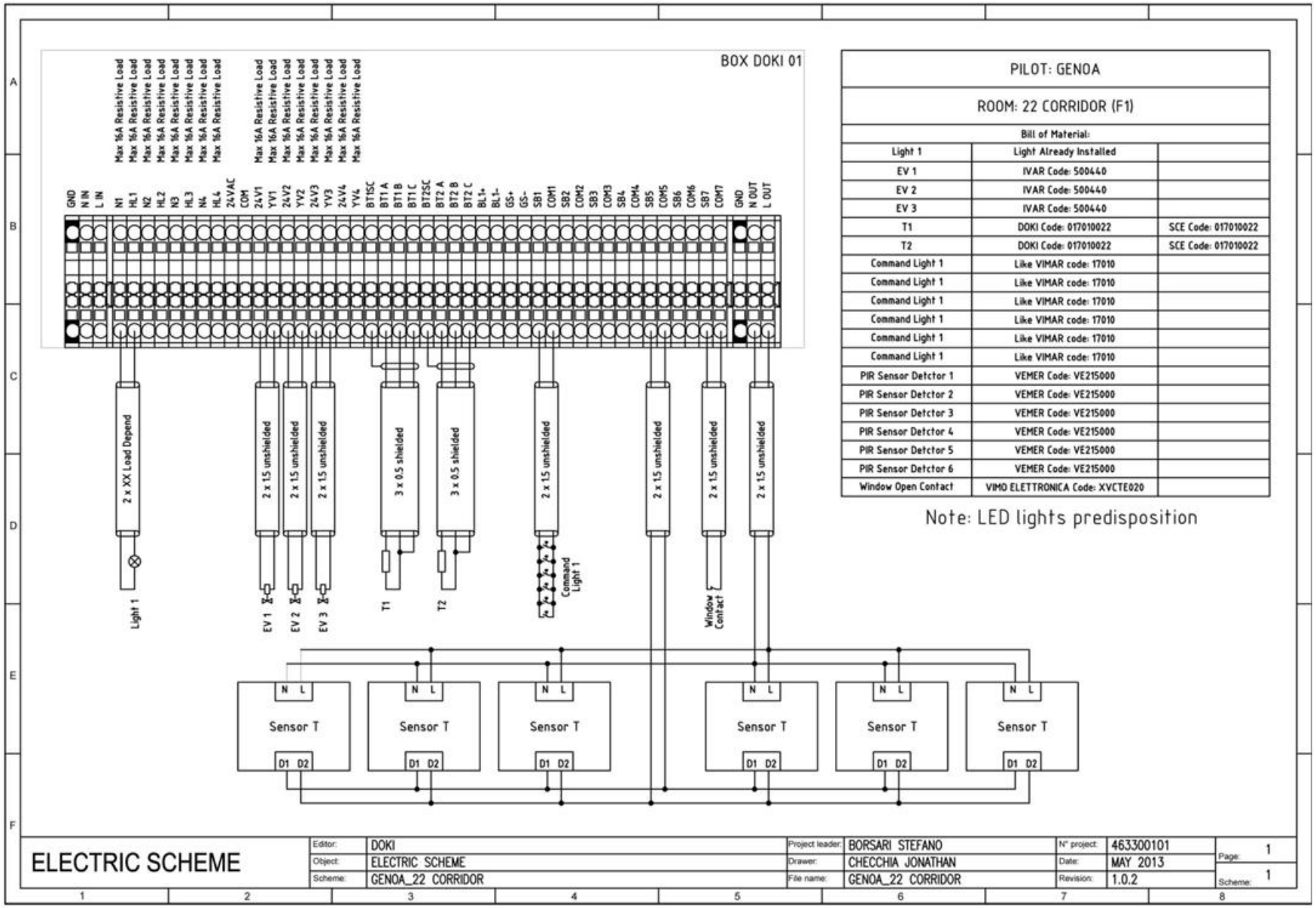


Figure 2-12: Wiring schema - Corridor 22 (F1)

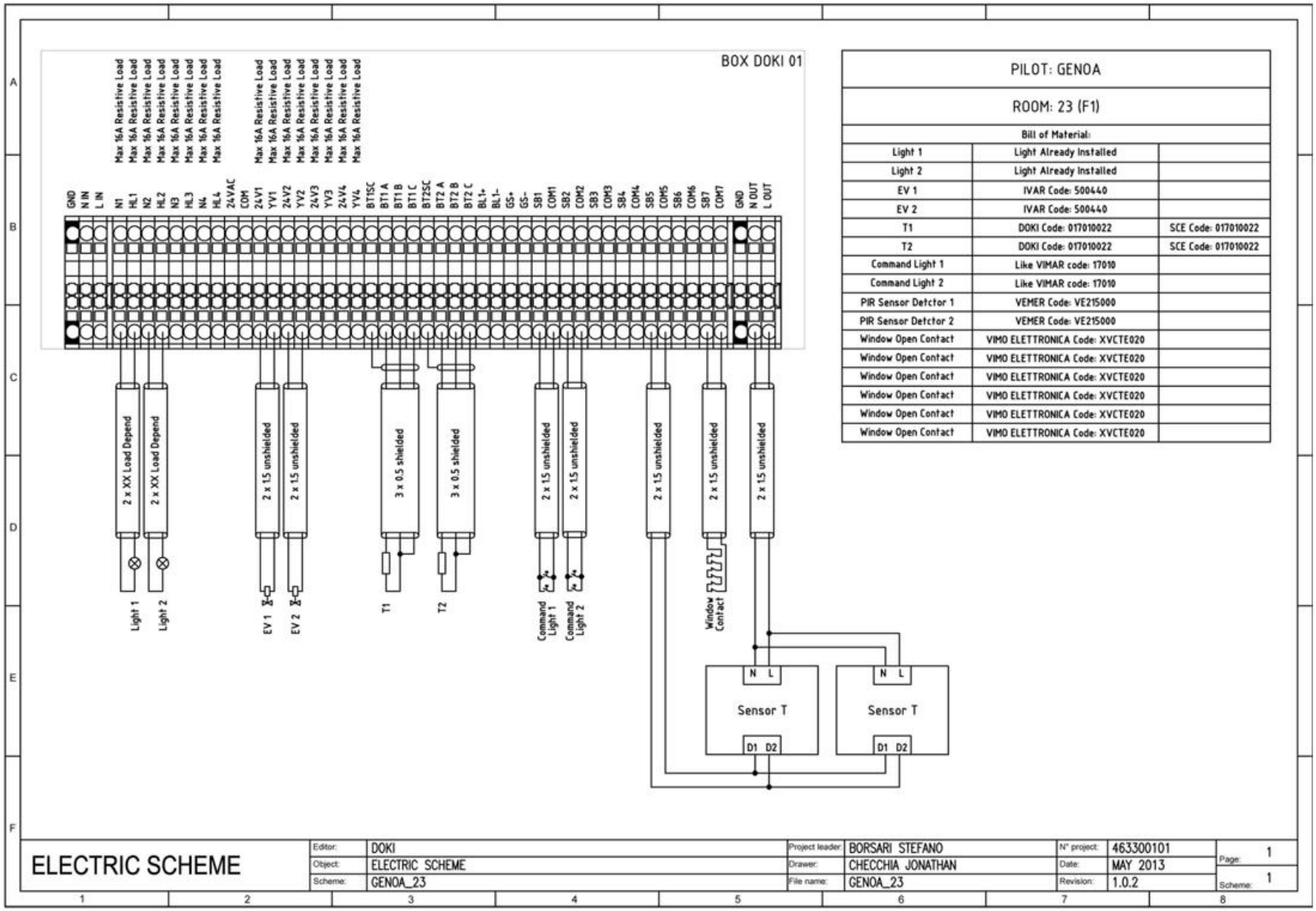


Figure 2-13: Wiring schema - Room 23 (F1)

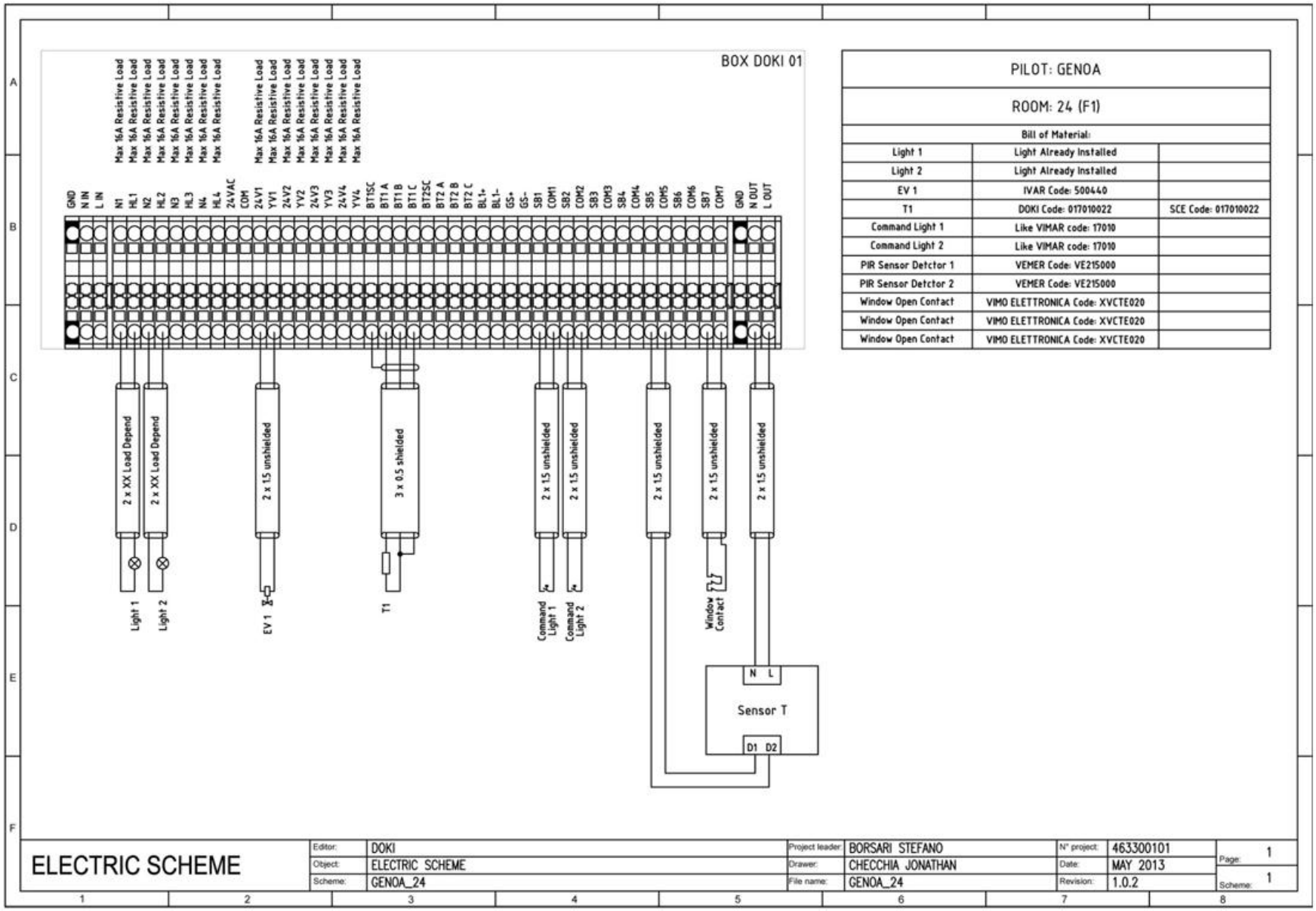


Figure 2-14: Wiring schema - Room 24 (F1)

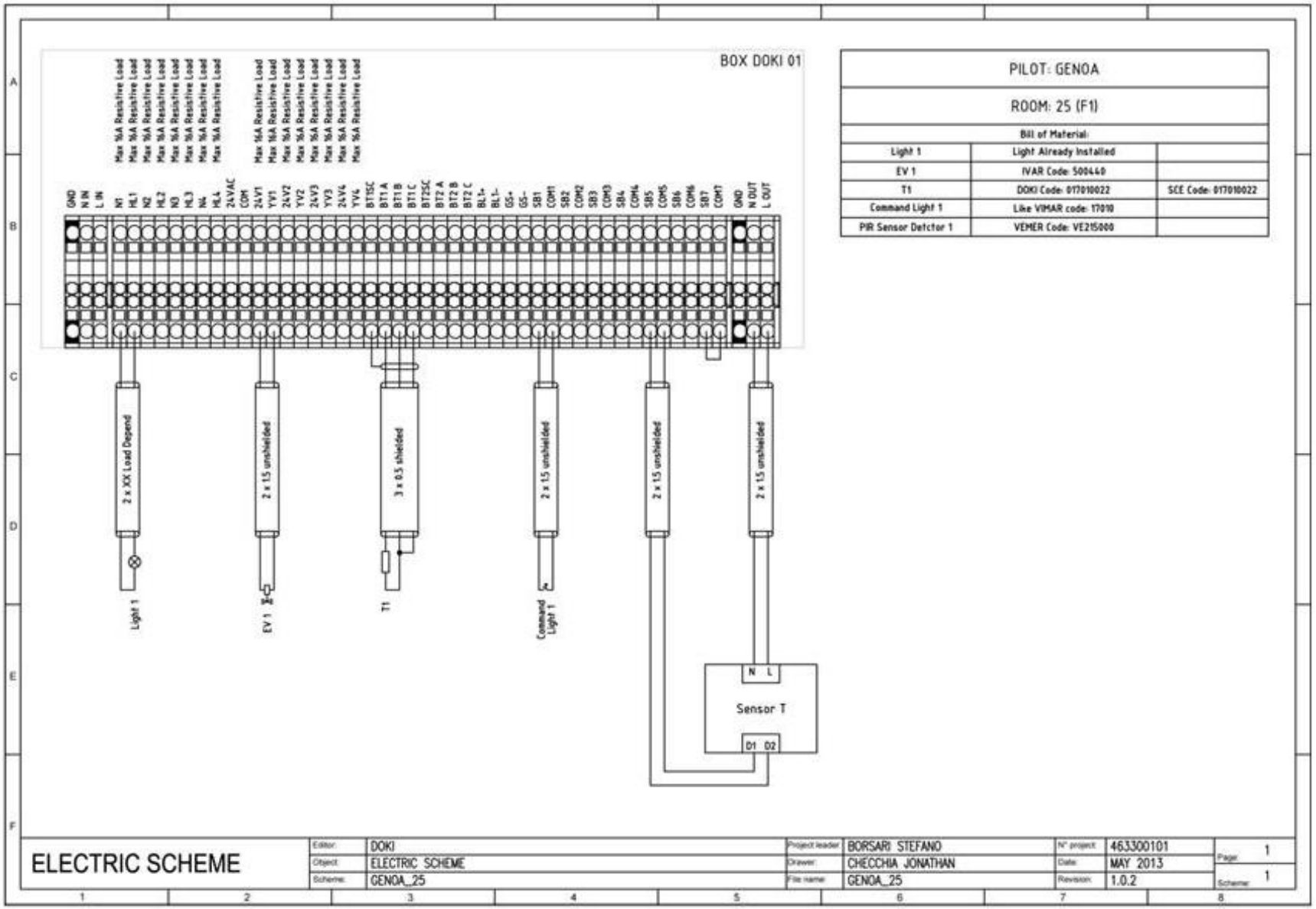


Figure 2-15: Wiring schema - Room 25 (F1)

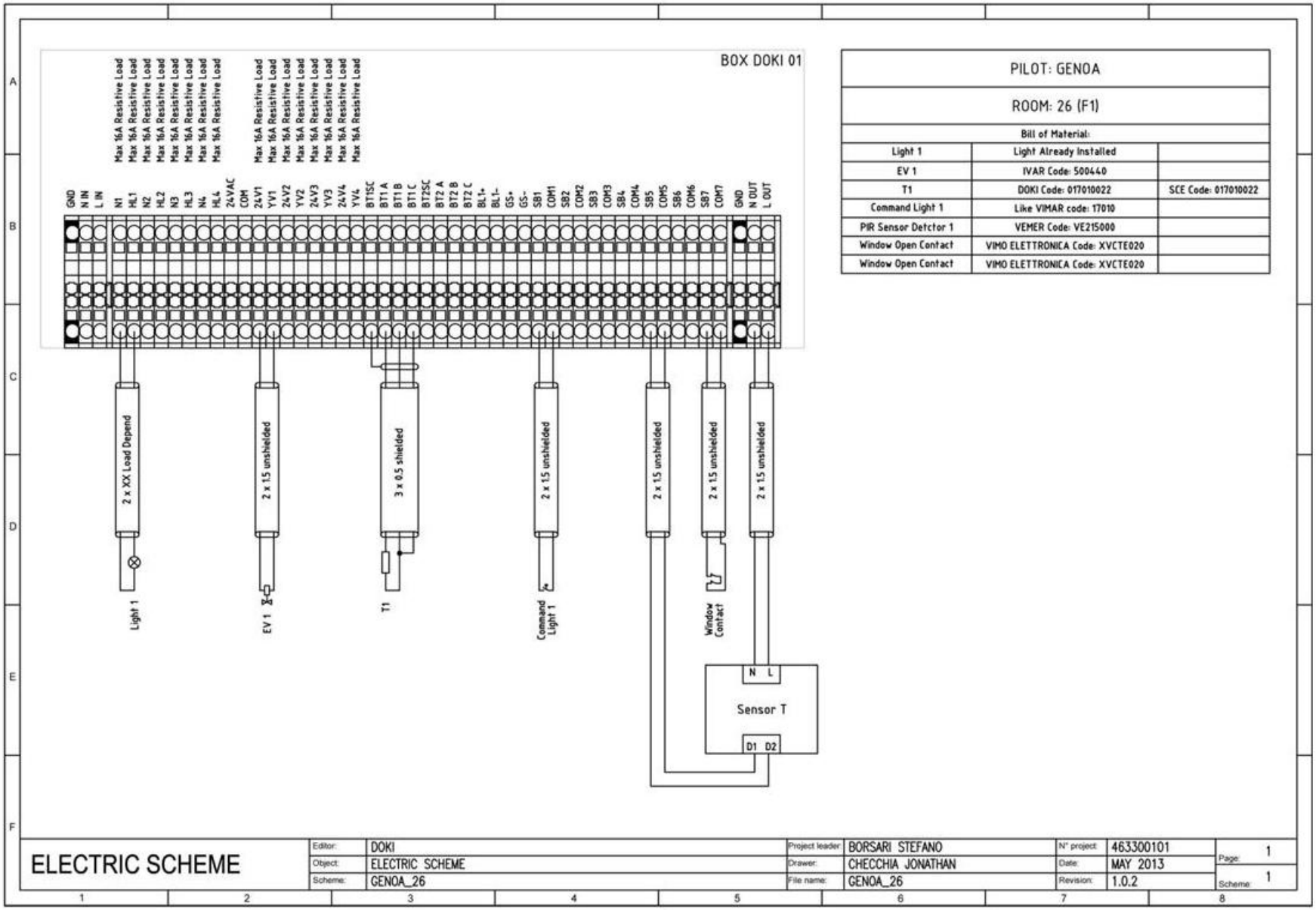


Figure 2-16: Wiring schema - Room 26 (F1)

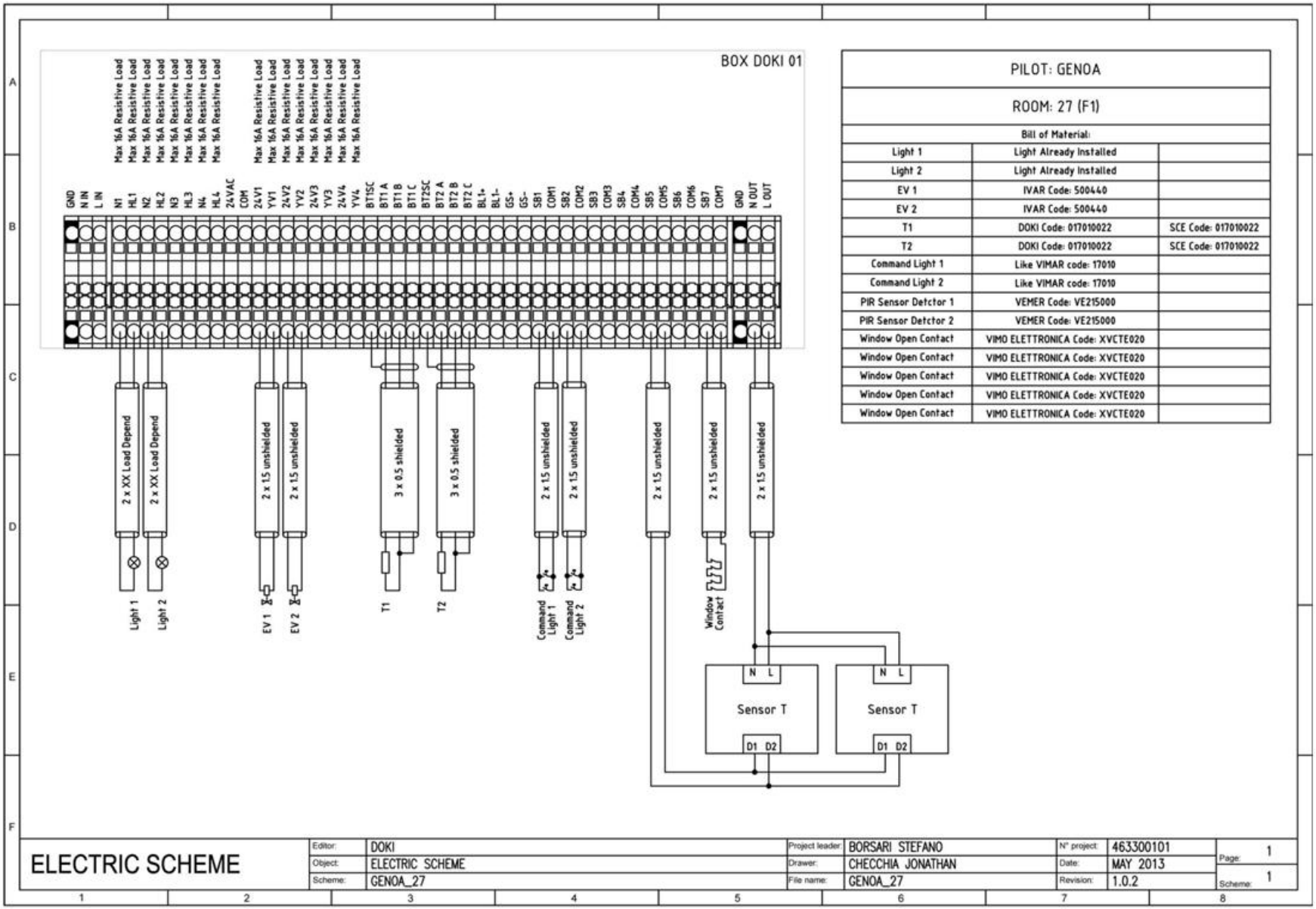


Figure 2-17: Wiring schema - Room 27 (F1)

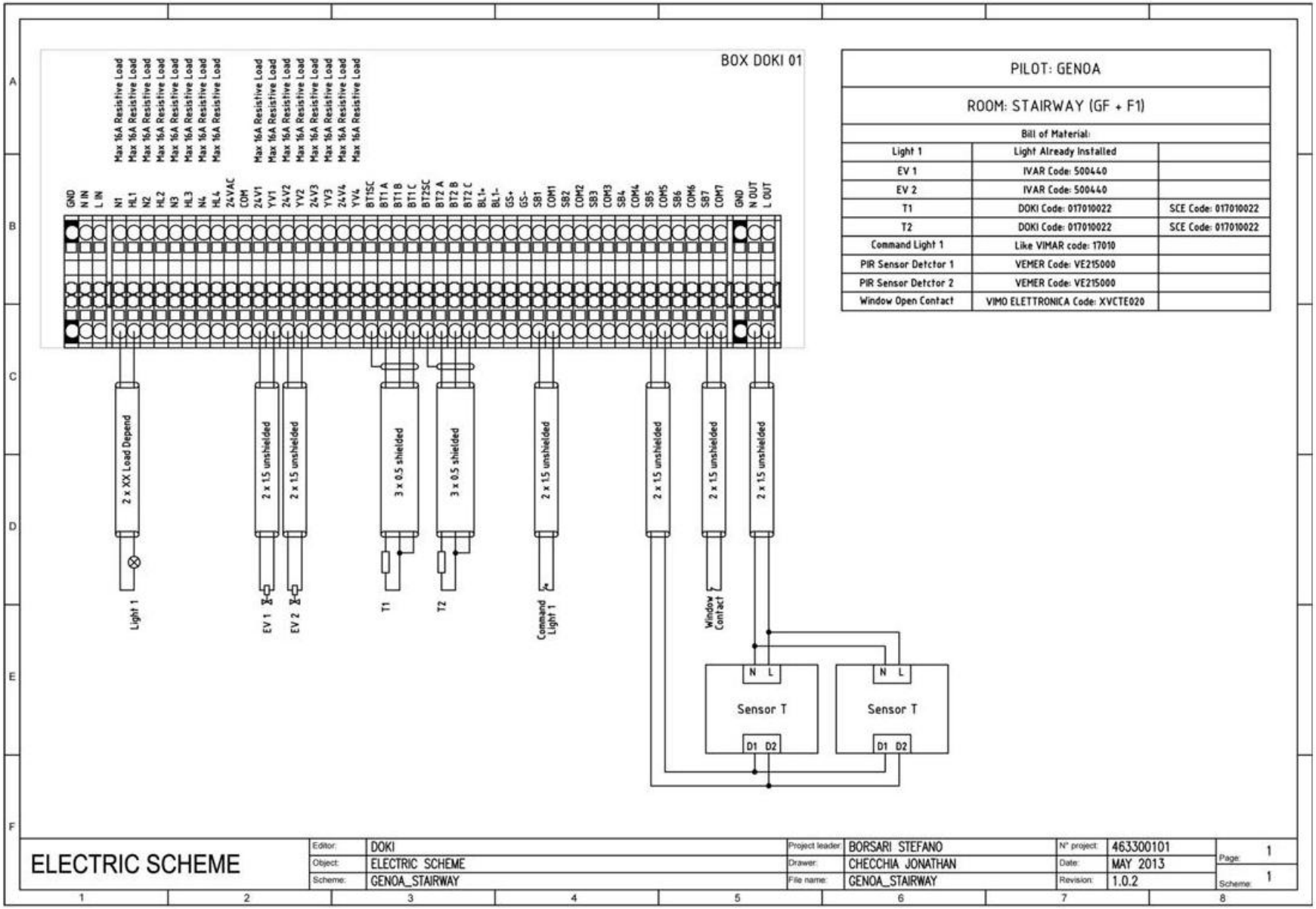


Figure 2-18: Wiring schema - Stairways (GF + F1)

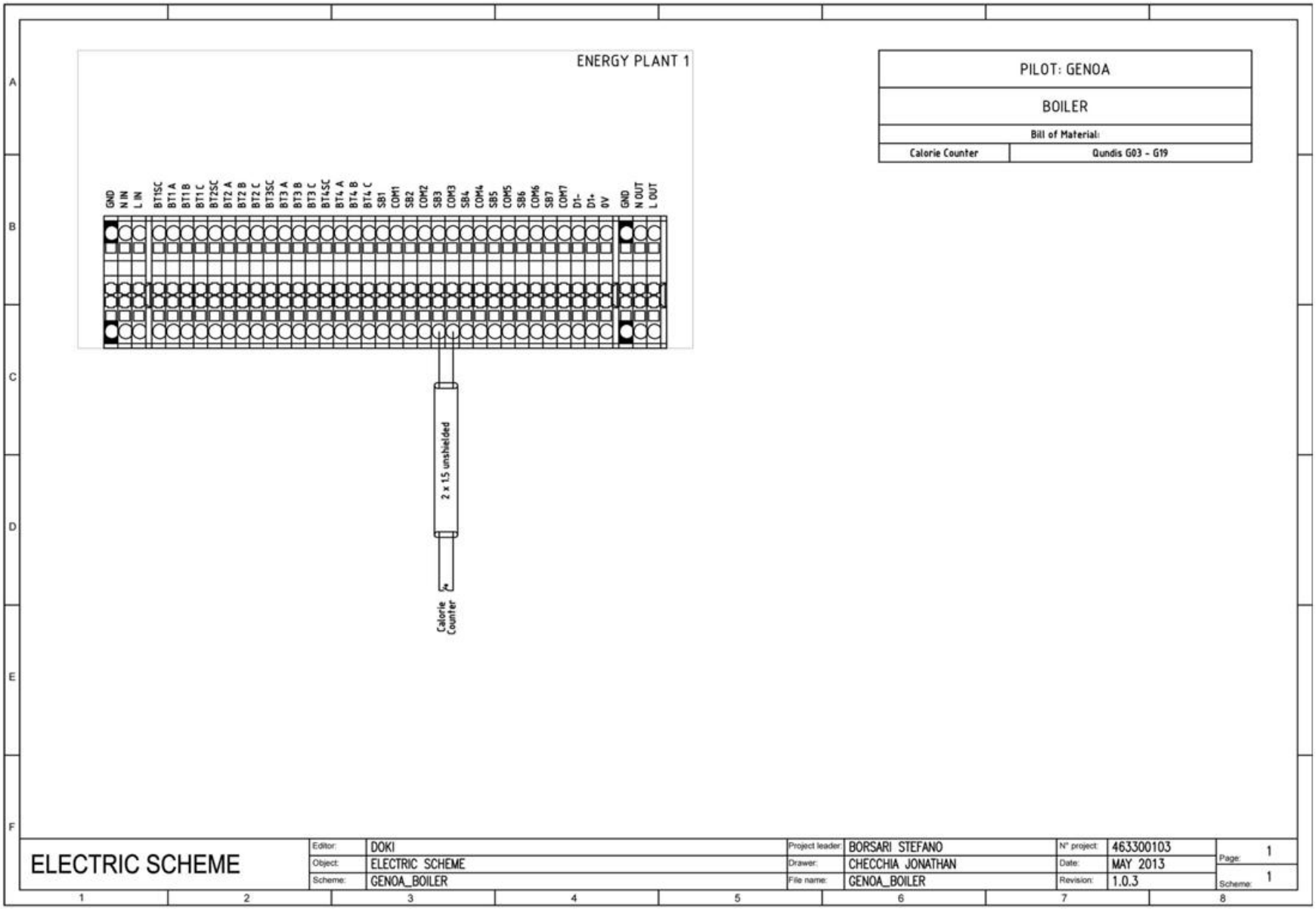


Figure 2-19: Wiring schema - Boiler House (Thermal Energy)

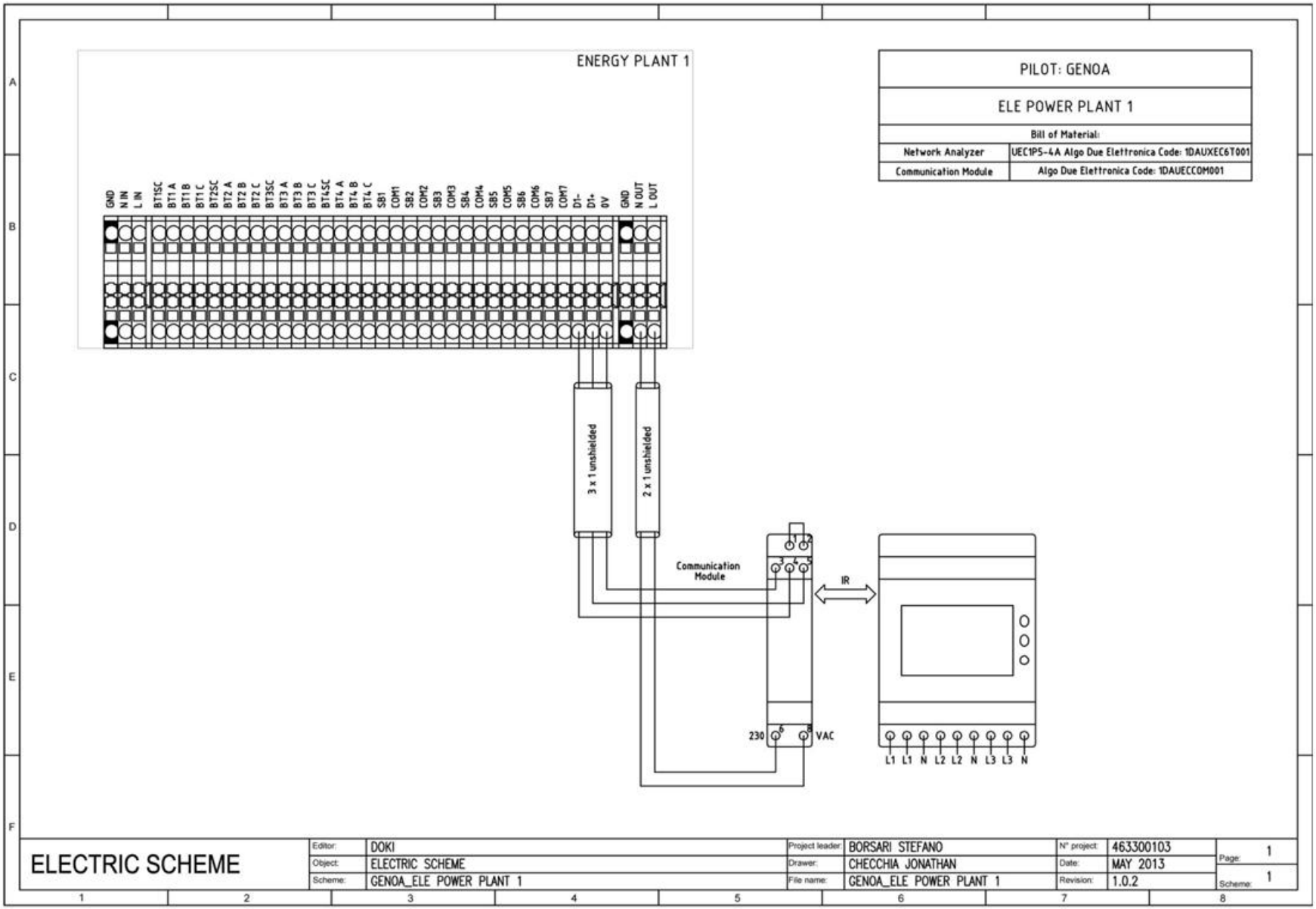


Figure 2-20: Wiring schema - Smart meter (School Electricity Measurement)

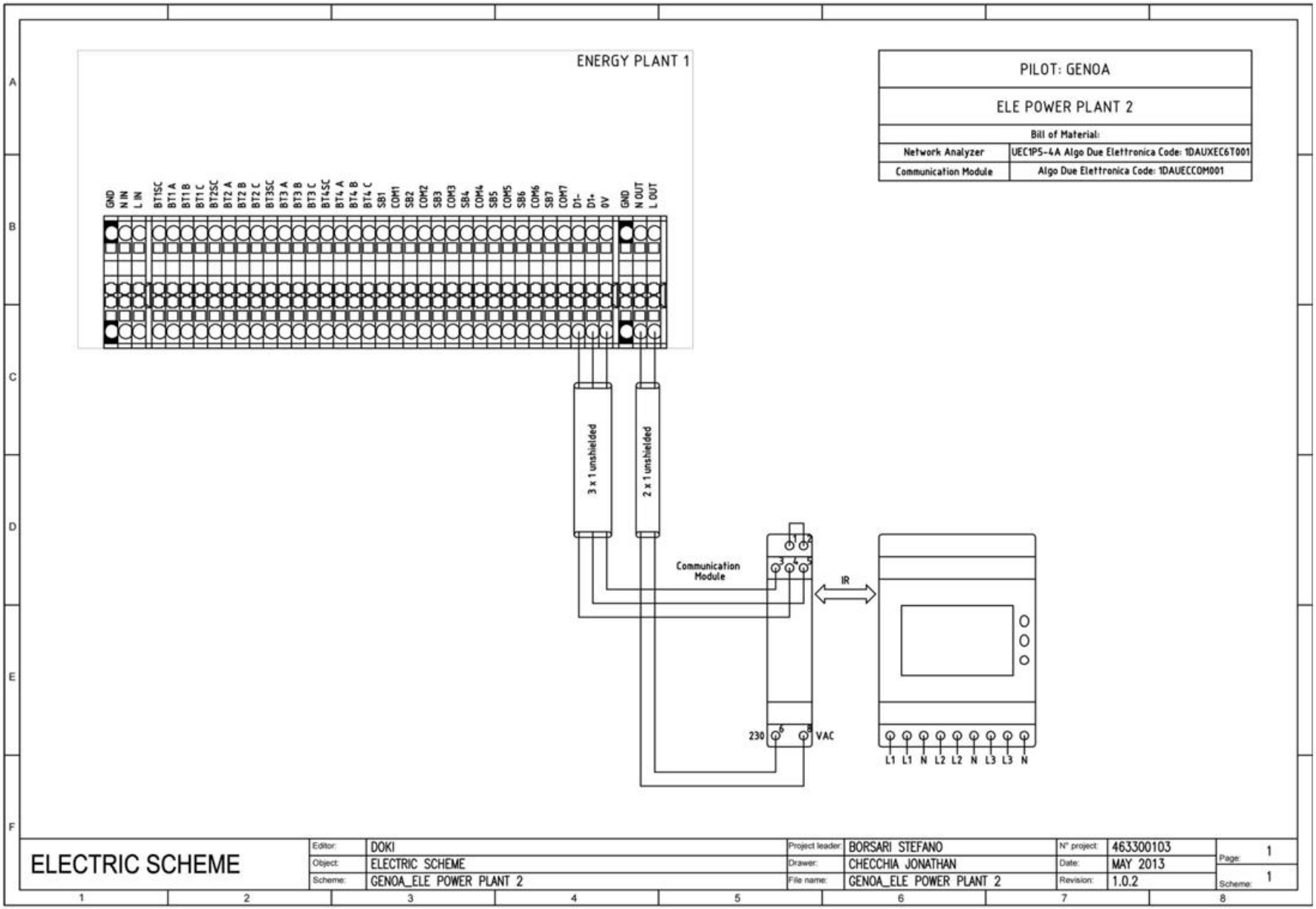


Figure 2-21: Wiring schema - smart meter (Pilot Electricity Measurement)

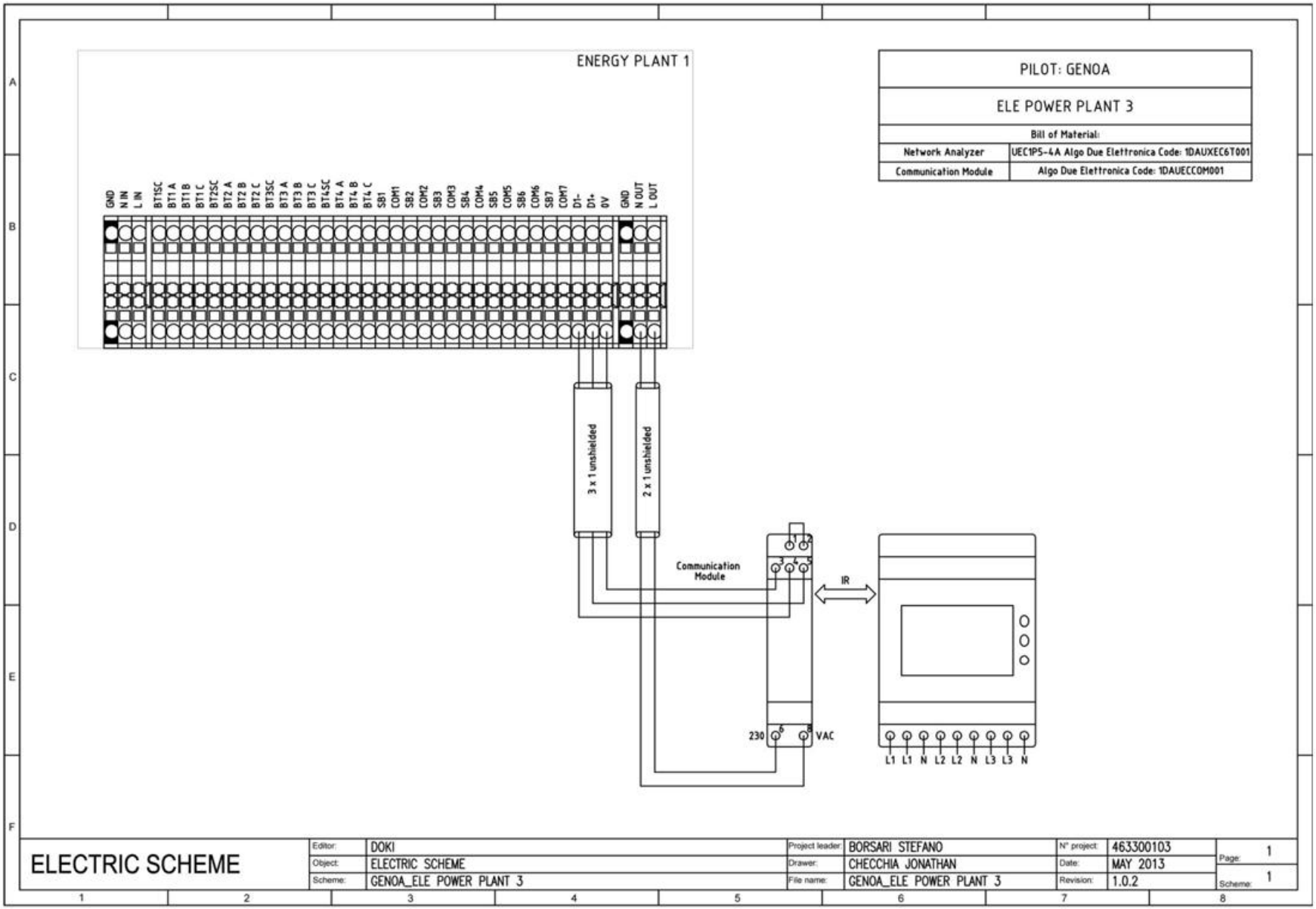


Figure 2-22: Wiring schema - smart meter [Renewable (PV) Energy Plant (not activated)]

2.2 Summary of Installed BEMS equipment in Pilot

Name	Description	Total	C# 19	C# 08	C# 7&9	Staiway	C# 2&3	C# 4a+6a	C# 24	C# 25	C# 23	C# 22	C# 27	C# 06	C# 13	C# 15	C# 14	C# 16	C# 21	C# 4&5	Boiler	Ele 1	Ele 2	Ele 3
Temperature sensors	internal	**23**		1	1	2	1	2	1	1	2	2	2	1	1	1	1	1	1	2				
	external	**1**	1																					
Valves		**24**	1	1	1	2	1	1	1	1	2	3	2	1	1	1	1	1	1	2				
Thermal meter		**1**																			1			
Window contacts Groups		**44**	2		3	1		4	3		6	1	5	6	3	3		2	3	2				
Presence detectors	Vemer	**31**	1	1	1	2	2	4	1	1	2	6	2	1	1	1	1	1	1	2				
Presence and Luxmeter	TheBens	**1**												1										
LED lamps	60W	**4**	2					1						1										
LED lamps	30W	**20**						4				10		6										
LED lamps	16W	**0**																						
Existing Lamps Groups		**20**		1	2	1	2		2	1	2		2		1	1	1	1	1	2				
Electric powerAnalyzer		**3**																				1	1	1
DOKI UNITS		**22**	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Note: the windows contacts groups were supplied by the local installer.

2.3 Specific points of the installation

CDG 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. DOKI BEMS was installed in a modern environment, with existing plants updated and in line with local regulations.
2. BEMS Installation was carried out following the very datailed set of documentation, comprehensive of the positions of valves, lights, sensors and windows prepared by CDG staff. Basically the wired control network has been installed with only 1 phisical point communication wireless with the DOKI Management Unit (PC Navigator).

3. As the Pilot has a relatively large number of rooms but some small in surface, the solution of using a single EVO Module to control two rooms/premises has been some time adopted (e.g. rooms 4A+6A and rooms 4+5WC).
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 by a Tender, with the help of CDG staff.
6. Heating system is previded through a. Heat measuring was obtained through a IVAR smart meter, selected with the objective of keeping the maximum adherence with existing devices. Installation of the smart meter was relatively easy as the heating plant had a specific piping for the sole Pilot.The smart meter in connected to the the Control Unit labeled “THERMAL PLANT”. Due to the distance between the heat generator and the position of the supervising PC, a wireless point to point connection has been installed to transmit the data of the heat measurer.
7. Heating distribution system (radiators) was transformed using on-off valves on all radiators, valves are from the brand IVAR. Classroom #14 hasn’t presently any heating. Nevertheless the room Control Unit has been configured with the temperature control for satisfying future needs.
8. The LED technology has been considered in two classrooms for replacing exsisting fluorescent lamps: one of them is equipped with a dimming control and luxmeter, the other one has ON/OFF control based on the room occupancy profiles. Quality of installation was particularly satisfactory, as wiring was hidden in the ceiling avoiding external cabling.
9. The external temperature sensor has been connected to a “virtual” EVO module phisically inserted in the Control Box labeled “ROOM: 19 (F1)”.
1. One smart meter has been installed to get the electricity measurement of the building. The building has installed a photovoltaic plant, which is presently not operating and not connected to the grid. A dedicated Control unit labeled “ELE POWER PLANT 3” has been configured to allow the PV plant management if it might come in operation before the end of the VERYSchool project.
10. The remaining devices were left in place as spare parts.
11. All drawings have been updated and refer to the wiring actually existing in the Pilot.

3. Web Remote Access to the SCADA PC DOME.

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

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

The representation of planimetry has been customized for each Pilot; it shows to the user the rooms temperature, the indoor lighting levels, energy measurement, alarms and other informations.

The Genoa 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.

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

3.1 Web Access

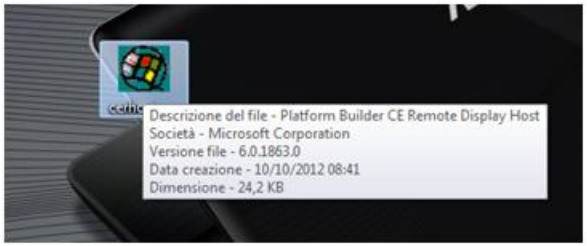
Edit on: 02/10/2013 - Version: 1.0 - **DOME PC Network Access**

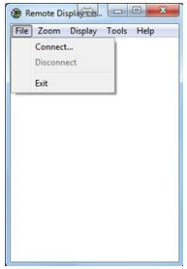
Il seguente documento illustra la procedura da eseguire per effettuare l'accesso via internet al BEMS di VERYSchool. Accesso VPN Comune di Genova.

La prima operazione da effettuare è accedere alla VPN di Genova mediante il software fornito dal comune stesso.

Esistono due modi:

1. il primo è digitare il seguente indirizzo nel browser: http://192.168.146.113:5800. Questo browser, comunque, richiede l'installazione di Java, se non già installato nel tuo PC. Connettersi a http://www.java.com/it/download/. Sarà necessario accettare tutte le richieste per la sicurezza di Windows prima di avviare la connessione. Selezionare OK attraverso piccola finestra che apparirà per avviare la connessione.
2. il secondo è quello di avviare il programma **Cerhost.exe**



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

Selezionare Connect, apparirà la seguente finestra 

in cui bisogna digitare il seguente indirizzo **IP: 192.168.146.113**

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

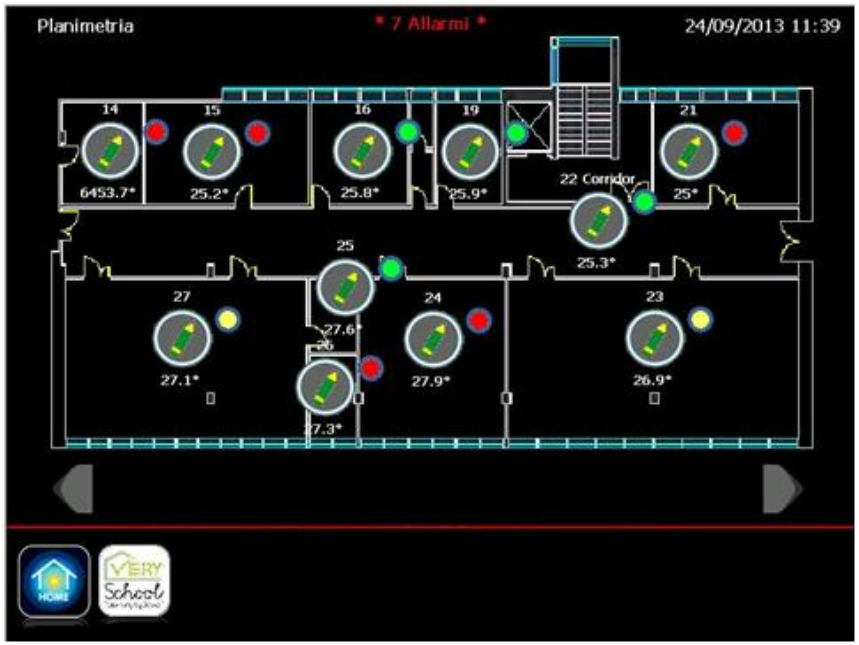
3.2 Descrizione d'uso

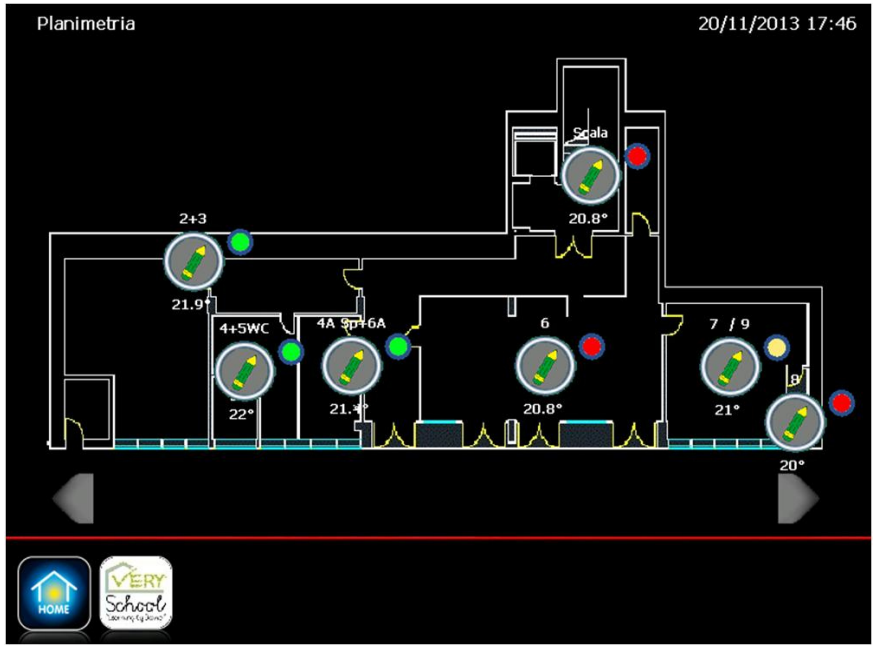
A questo punto è possibile utilizzare il PC come se si fosse in loco, ci si troverà da qui in poi nella medesima situazione, indipendentemente da quale dei metodi di collegamento si è scelto.

3.2.1 Tasto VerySchool

Nella schermata principale sono visibili gli allarmi informano di qualche eventuale malfunzionamento, e, soprattutto, se le finestre di qualche ambiente sono aperte, come illustrato nell'immagine di sopra.

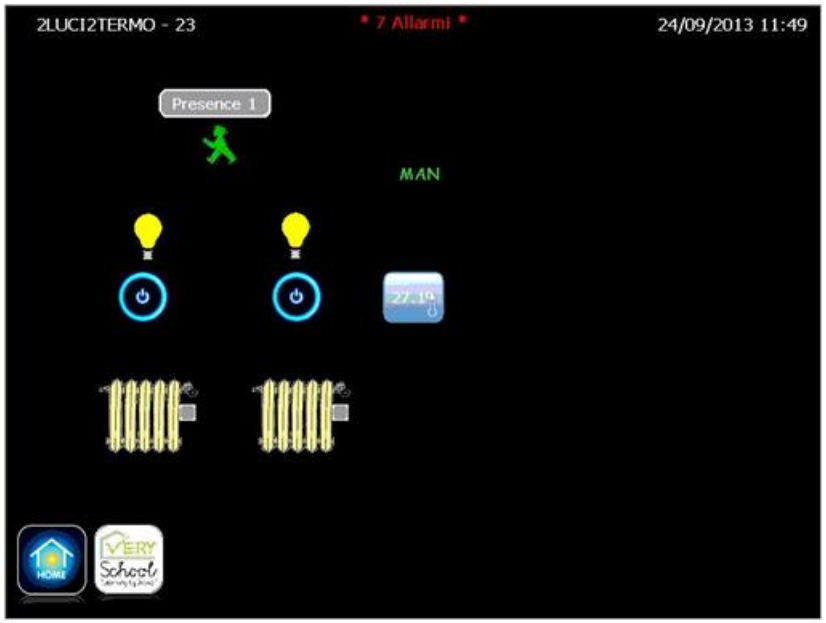
Premendo il tasto VERYSchool  , primo da sinistra nella pagina inziale, sarà visualizzata la planimetria del Pilot ed è possibile accedere al menu di regolazione climatica e a quello di Luci. Le frecce a destra e sinistra consento di selezionare planimetrie ristrette.





Questo menu permette di accendere e spegnere le luci selezionando il punto (aula) di interesse. Si consiglia, comunque, di non modificarne lo stato dei dispositivi, cliccando sulle relative icone, se non si disabilita la modalità automatico della regolazione locale (stanza).

Nella pagina che comparirà si potrà gestire l'aula e vedere le informazioni più importanti:



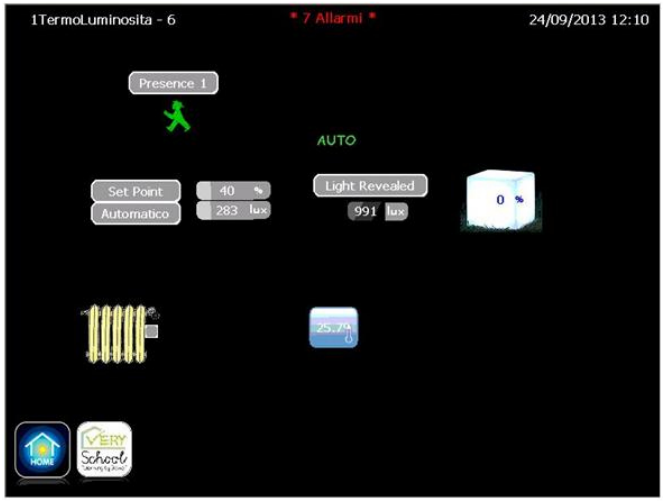
Per quanto riguarda le luci premendo il tasto power  è possibile accendere e spegnere le luci.

Il sensore di presenza, rappresentato dal simbolo  , in rosso o in verde indica il regime di occupazione:
omino verde = presenza; omino rosso = nessuna presenza.

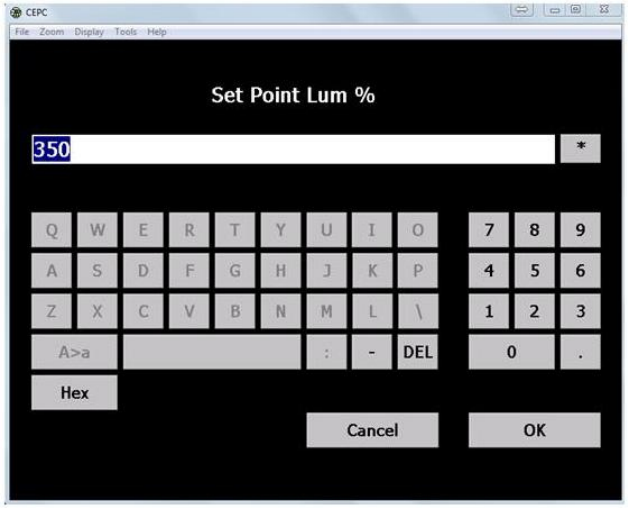
Lo stato di funzionamento dell'aula è rappresentato con il simbolo  che assume i seguenti significati:
Auto = Automatico, Man = Manuale e Stand-By = Luci spente senza presenza rilevata in aula.

Lo stato di ogni luce è rappresentato dal simbolo  (luce gialla accesa, luce grigia spenta) e cliccando sul simbolo è possibile modificarne lo stato. Questo però sospende il funzionamento automatico del controllo luci, per cui si consiglia di utilizzarlo avendo chiare le conseguenze.

Alcune aule possiedono anche il sensore di luminosità, un esempio è riportato qui sotto:



Il valore di set-point della luminosità interna è espresso in percentuale ed in lux: nell'esempio sopra illustrato il valore 40% corrisponde a 283 lux. I valori sono diversi per ogni sensore in quanto per ognuno di essi è stata eseguita una taratura. L'unico parametro modificabile è il valore in percentuale. Cliccando all'interno della cesella apparirà una finestra con una tastiera numerica e si può inserire il valore desiderato.



Il valore è espresso in decimi di percentuale, pertanto per modificarlo occorre scrivere ad esempio 350 per ottenere il 35%. Il set point in percentuale serve al sistema per decidere se accendere una nessuna o entrambe le luci.

Nel caso in cui si volesse gestire le luci dimmerate, l'intensità luminosa delle stesse sarà regolata in base a set point e alla luminosità rilevata dal sensore in ambiente. Il numero sotto la dicitura Light Revealed 

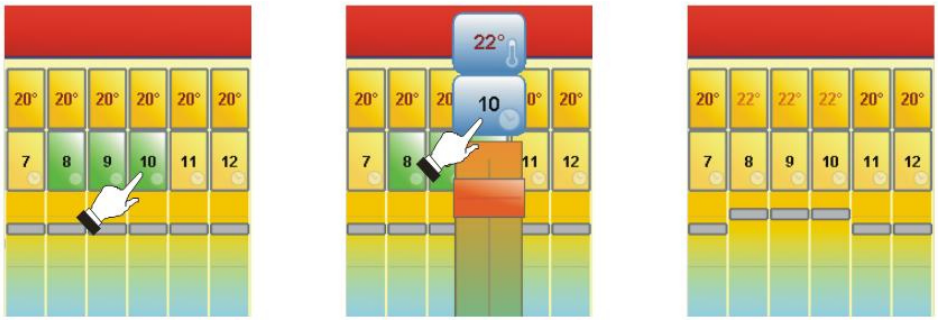
rappresenta i lux misurati in tempo reale all'interno dell'aula istante grazie al sensore ambiente posizionatovi. All'interno del cubo luminoso è rappresentata, solo in visualizzazione, la percentuale di dimmeraggio delle luci. Tale percentuale è decisa dal firmware in base al set point automatico impostato (es. 40% - 283 Lux), alla luminosità ambiente misurata (es.991 lux) ed alla presenza o meno all'interno della stanza.

Premendo il pulsante OK si conferma la scelta effettuata; con il pulsante Cancel si ritorna alla pagina precedente senza effettuare alcuna modifica al valore precedente.

Selezionando il pulsante  si accede al menu di regolazione della temperatura, che simula un cronotermostato come calendario alle 24 ore settimanale.

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

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



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

 Estate  Inverno  Spento

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

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

3.2.2 Tasto Consumi

Dalla pagina principale, selezionando il tasto  , si accede alla pagina dei consumi elettrici [1].

[1] il menu di selezione dei multimetri relativi al Pilot o alla Scuola, e successivamente all'impianto fotovoltaico, è in corso di mimplementazione.

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

Il tasto  consente di accedere alla visualizzazione dei consumi termici. 

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

4.1 Summary Table.

Area	Item	Variables				Sensors / Hardware							
		Digital	Anologue	SW	Total	Temp	Presence	Luxmeter	Valves	Lighting Circuits	groups of radiators	Electrical Meter	Thermal meter
Class Rooms	*Room #6 (with LED & dimming)*	3	12	75	**90**	1	1	1	1	1	1		
	Class 14 (F1, with NO Heating)	2	5	21	**28**		1			1			
	Class 15 (F1)	4	10	54	**68**	1	1		1	1	1		
	Class 16 (F1)	4	10	54	**68**	1	1		1	1	1		
	Class 19 (F1, with LED & no dimming)	4	10	54	**68**	1	1		1	1	1		
	Room 21 (F1)	4	10	54	**68**	1	1		1	1	1		
	Room 23 (F1)	6	15	66	**87**	1	1		2	2	1		
	Room 24 (F1)	5	12	60	**77**	1	1		2	1	1		
	Room 25 (F1)	4	10	54	**68**	1	1		1	1	1		
	Room 26 (F1)	4	10	54	**68**	1	1		1	1	1		
	Room 27 (F1)	6	15	66	**87**	1	1		2	2	1		
	Nursery 7 + 9 (GF)	5	12	60	**77**	1	1		1	2	1		
Entrance, Lobby, Corridors	*fitting room 4A + corridor 6A (with LED)*	6	12	60	**78**	1	2		1	2	1		
	Stairs	5	13	60	**78**	1	1		2	1	1		
	Corridor 22 (with LED)	6	16	66	**88**	1	1		3	1	1		
	Laundry 2 + Corridor 3 (GF)	6	12	60	**78**	1	2		1	2	1		
Bath Rooms	*WC #4 + #5*	7	15	66	**88**	1	2		2	2	1		
	Bathroom 8 (GF)	4	10	54	**68**	1	1		1	1	1		
General	*School: Electrical and Thermal Networks*	0	11	36	**47**							1	1
	Pilot: Electrical Measurement	0	10	42	**52**							1	
	Meteo data	0	1	6	**7**	1							
	Photovoltaic Plant (not activated)	0	0	0	**0**							1	
TOTALS		**85**	**231**	**1.122**	**1.438**	**19**	**21**	**1**	**25**	**24**	**18**	**3**	**1**

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

4.2 Room Tables.

	Label	Room #6 (with LED & dimming)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.13 - Data received by DOKI - Data Transmission = 5 minutes.
1	GECL001ALIOLPIDD01	Lighting: Control signal	volt		1		1	**PID regolation output 0÷10 [volt]. Light Status: ON if GECL001ALIOLPIDD01>0; OFF if GECL001ALIOLPIDD01=0**, type LED.
2	GECL001ALIBLRROM01	Room Brightness	lux		1		1	Brightness measurement.
3	GECL001ALISPBLRS01	Set Point Room Brightness	lux		1		1	Brightness Setpoint
4	GECL001OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	GECL001ATIROOTEM01	Room Temperature	°C		1		1	
6	GECL001ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
7	GECL001RADMINVEC01	Radiator: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
8	GECL001RADMINVAM01	Radiator: Minutes ON	minutes		1		1	Cumulative in the hour
9	GECL001RADHOUVAM01	Radiator: Hours ON	hours		1		1	Cumulative from the installation
10	GECL001RADPIDORC01	Radiator: Control signal	%		1		1	**Control signal: < 50% R1 = OFF; > 50% R1 = ON**
11	GECL001WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
12	GECL001OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
13	GECL001RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
14	GECL001ALITRELIS01	Threshold Light 1	%		1		1	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model**
15	GECL001ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				3	**12**	**0**	**15**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	GECL001ALILILEDH01	Lighting: Control signal	volt	1	1	1	3	Average among all value of **GECL001ALIOLPIDD01** in the specific time interval
2	GECL001ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	**[Number of Events that GECL001ALIOLPIDD01>0] * 5 [minutes]**
3	GECL001ALIBLRROH01	Room Brightness	Lux	1	1	1	3	Average among all value of **GECL001ALIBLRROM01** in the specific time interval
4	GECL001ALISPBLRH01	Set Point Room Brightness	lux	1	1	1	3	Last value of **GECL001ALISPBLRS01** in the specific time interval
5	GECL001ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **GECL001ATIROOTEM01** in the specific time interval
6	GECL001ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **GECL001ATIROOTES01** in the specific time interval
7	GECL001OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	[Number of events that **GECL001OCCPRESEM01 > 0**] *** 5 [minutes]**
8	GECL001RADMINVAH01	Radiator (Valve): Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **GECL001RADMINVAM01** in the specific time interval
9	GECL001WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **GECL001WINWIOPEM01 > 0**] * 5 [minutes]
10	GECL001ALIERGCLH01	Lighting Energy Consumption	kWh	1	1	1		**[GECL001ALIMINLIH01 * (GECL001ALILIFLUH01/10) * TotalWatt]/1000; TotalWatt = (6*30W) = 180 [Watt].**
11	GECL001THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[GECL001RADMINVAM01 * NominalPower]/1000]; NominalPower = 2261 [Watt]**
11	GECL001ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		[**GECL001ATIROOTEM01 > GECL001ATIROOTEM01**] AND [**GECL001RADMINVAH01>0**]
12	GECL001ATILHTSPH01	"Luxamb < Set-point & Light ON"	events	1	1	1		[**GECL001ALIBLRROM01 < GECL001ALISPBLRS01**] AND [**GECL001ALIOLPIDD01>0**]
13	GECL001WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**GECL001WINWIOPEH01>0** AND **GECL001RADMINVAH01>0**]
14	GECL001OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**GECL001OCCROWOWM01 <> 0**] in the specific time interval
15	GECL001ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[**GECL001ALIMINLIH01>0**] AND [**GECL001OCCPRESEM01=0**]
16	GECL001THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
17	GECL001THCLTHSOH01	Last time heating system is OFF	timestamp			1		The last time the heating system is turned OFF during the whole day.
			TOTALS	**16**	**16**	**17**	**26**	
				75				

Figure 4-2: Room #6 - physical measurement and HQDS variables.

	Label	Class 14 (F1, with NO Heating)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.16 - Data received by DOKI - Data Transmission = 5 minutes.
1	GECL002ALILIFLUC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	GECL002ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour.
3	GECL002ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative for the installation.
4	GECL002OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	GECL002OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic**; **1 = manual**; **2 = stand-by**.
6	GECL002RADTHRADS01	Threshold Radiator 1	%		1		1	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
7	GECL002ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				2	**5**	**0**	**7**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	GECL002ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **GECL002ALIMINLIM01** in the specific time interval
2	GECL002OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	[Number of events that **GECL002OCCPRESEM01 > 0**] *** 5 [minutes]**
3	GECL002ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**[GECL002ALIMINLIH01 * TotalWatt]/1000; TotalWatt = (1*2*58W) = 116 [Watt]**
4	GECL002OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**GECL002OCCROWOWM01 <> 0**] in the specific time interval
5	GECL002ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[**GECL002ALIMINLIH01>0**] AND [**GECL001OCCPRESEM01=0**] in the specific time interval
			TOTALS	**5**	**5**	**5**	**6**	
				21				

Figure 4-3: Class #14 - physical measurement and HQDS variables.

	Label	Class 15 (F1)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.17 - Data received by DOKI - Data Transmission = 5 minutes.
1	GECL003ALILIFLUC01	Lighting: Status	ON/OFF	1			**1**	0 = OFF; 1 = ON. type fluorescent
2	GECL003ALIMINLIM01	Lighting: Minutes ON	minutes		1		**1**	Cumulative in the hour.
3	GECL003ALIHOULIM01	Lighting: Hours ON	hours		1		**1**	Cumulative for the installation.
4	GECL003OCCPRESEM01	Presence Sensor	yes / no	1			**1**	0 = NO; 1 = YES
5	GECL003ATIROOTEM01	Room Temperature	°C		1		**1**	
6	GECL003ATIROOTES01	Set-Point Room Temperature	°C		1		**1**	Current Set-Point of the Room Temperature
7	GECL003RADMINVEC01	Radiator: status	yes / no	1			**1**	0 = Valve OFF; 1 = Valve ON
8	GECL003RADMINVAM01	Radiator: Minutes ON	minutes		1		**1**	Cumulative in the hour
9	GECL003RADHOUVAM01	Radiator: Hours ON	hours		1		**1**	Cumulative from the installation
10	GECL003RADPIDORC01	Radiator: Control signal	%		1		**1**	**Control signal: < 50% R1 = OFF; > 50% R1 = ON**
11	GECL003WINWIOPEM01	Windows: status	close/open	1			**1**	0 = Windows CLOSED; 1 = Windows OPENED
12	GECL003OCCROWOWM01	Room Control Status	-		1		**1**	**0 = automatic; 1 = manual; 2 = stand-by.**
13	GECL003RADTHRADS01	Threshold Radiator 1	%		1		**1**	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
14	GECL003ALIWAITIT01	Waiting Time	minutes		1		**1**	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				4	**10**	**0**	**14**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	GECL003ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	**3**	ABS (last value - first value) of **GECL003ALIMINLIM01** in the specific time interval
2	GECL003ATIROOTEH01	Room Temperature	°C	1	1	1	**3**	Average among all value of **GECL003ATIROOTEM01** in the specific time interval
3	PVCL003ATSPTEMH01	Set-Point Room Temperature	°C	1	1		**2**	Last value of **GECL003ATIROOTES01** in the specific time interval.
4	GECL003OCCPRESEH01	Presence Sensor	minutes	1	1	1	**3**	[Number of events that **GECL003OCCPRESEM01 > 0**] * 5 [minutes]
5	GECL003RADMINVAH01	Radiator (Valve): Minutes ON	minutes	1	1	1	**3**	ABS (last value - first value) of **GECL003RADMINVAM01** in the specific time interval
6	GECL003WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	**3**	[Number of events that **GECL003WINWIOPEM01 > 0**] * 5 [minutes]
7	GECL003ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**[GECL003ALIMINLIH01 * TotalWatt]/1000; TotalWatt = (3*2*36W) = 216 [Watt]**
8	GECL003THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[GECL003RADMINVAM01 * NominalPower]/1000; NominalPower = 1455 [Watt]**
9	GECL003ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		[**GECL003ATIROOTEM01 > GECL003ATIROOTEM01**] AND [**GECL003RADMINVAH01>0**]
10	GECL003WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**GECL003WINWIOPEM01>0** AND **GECL003RADMINVAH01>0**] in the specific time interval
11	GECL003OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**GECL003OCCROWOWH01<>0**] in the specific time interval
12	GECL003ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[**GECL003ALIMINLIH01>0** AND **GECL003OCCPRESEM01=0**] in the specific time interval
13	GECL003THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
14	GECL003THCLTHSOH01	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 4-4: Class #15 - physical measurement and HQDS variables.

	Label	Class 16 (F1)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.18 - Data received by DOKI - Data Transmission = 5 minutes.
1	GECL004ALILIFLUC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	GECL004ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour.
3	GECL004ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative for the installation.
4	GECL004OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	GECL004ATIROOTEM01	Room Temperature	°C		1		1	
6	GECL004ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
7	GECL004RADMINVEC01	Radiator: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
8	GECL004RADMINVAM01	Radiator: Minutes ON	minutes		1		1	Cumulative in the hour
9	GECL004RADHOUVAM01	Radiator: Hours ON	hours		1		1	Cumulative from the installation
10	GECL004RADPIDORC01	Radiator: Control signal	%		1		1	**Control signal: < 50% R1 = OFF; > 50% R1 = ON**
11	GECL004WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
12	GECL004OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic**; **1 = manual**; **2 = stand-by**.
13	GECL004RADTHRADS01	Threshold Radiator 1	%		1		1	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
14	GECL004ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				4	**10**	**0**	**14**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	GECL004ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **GECL004ALIMINLIM01** in the specific time interval
2	GECL004ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **GECL004ATIROOTEM01** in the specific time interval
3	GECL004ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **GECL004ATIROOTES01** in the specific time interval.
4	GECL004OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	[Number of events that **GECL004OCCPRESEM01 > 0**] *** 5 [minutes]**
5	GECL004RADMINVAH01	Radiator (Valve): Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **GECL004RADMINVAM01** in the specific time interval
6	GECL004WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **GECL004WINWIOPEM01 > 0**] * 5 [minutes]
7	GECL004ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**[LECL003ALIMINLIH01 * TotalWatt]/1000; TotalWatt = (2*2*36W) = 144 [Watt]**
8	GECL004THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[(GECL004RADMINVAM01 + GECL004RADMINVAM02) * NominalPower]/1000; NominalPower = 970 [Watt]**
9	GECL004ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		[**GECL004ATIROOTEM01 > GECL004ATIROOTEM01**] AND [**GECL004RADMINVAH01>0**]
10	GECL004WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**GECL004WINWIOPEM01>0** AND **GECL004RADMINVAH01>0**]
11	GECL004OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**GECL004OCCROWOWH01<>0**] in the specific time interval
12	GECL004ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[**GECL004ALIMINLIH01>0** AND **GECL004OCCPRESEM01=0**]
13	GECL004THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
14	GECL004THCLTHSOH01	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 4-5: Class #16 - physical measurement and HQDS variables.

	Label	Class 19 (F1, with LED	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.19 - Data received by DOKI - Data Transmission = 5 minutes.
1	GECL005ALILILEDC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type LED
2	GECL005ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour.
3	GECL005ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative for the installation.
4	GECL005OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	GECL005ATIROOTEM01	Room Temperature	°C		1		1	
6	GECL005ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
7	GECL005RADMINVEC01	Radiator: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
8	GECL005RADMINVAM01	Radiator: Minutes ON	minutes		1		1	Cumulative in the hour
9	GECL005RADHOUVAM01	Radiator: Hours ON	hours		1		1	Cumulative from the installation
10	GECL005RADHOUVAM02	Radiator: Control signal	%		1		1	**Control signal: < 50% R1 = OFF; > 50% R1 = ON**
11	GECL005WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
12	GECL005OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by**.
13	GECL005RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
14	GECL005ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				4	**10**	**0**	**14**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	GECL005ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **GECL005ALIMINLIM01** in the specific time interval
2	GECL005ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **GECL005ATIROOTEM01** in the specific time interval
3	GECL005ATISPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **GECL005ATIROOTES01** in the specific time interval.
4	GECL005OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	[Number of events that **GECL005OCCPRESEM01 > 0**] * 5 [minutes]
5	GECL005RADMINVAH01	Radiator (Valve): Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **GECL005RADMINVAM01** in the specific time interval
6	GECL005WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **GECL005WINWIOPEM01 > 0**] * 5 [minutes]
7	GECL005ALIERGCLH01	Lighting Energy Consumption	kWh	1	1	1		**[GECL005ALIMINLIH01 * TotalWatt_Circuit1]/1000; TotalWatt = (2*60W) = 120 Watt**
8	GECL005THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[GECL005RADMINVAM01 * NominalPower]/1000; NominalPower = 873 [Watt]**
9	GECL005ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		[**GECL005ATIROOTEM01 > GECL005ATIROOTEM01**] AND [**GECL005RADMINVAH01>0**]
10	GECL005WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**GECL005WINWIOPEM01>0** AND **GECL005RADMINVAH01>0**]
11	GECL005OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**GECL005OCCROWOWH01<>0**] in the specific time interval
12	GECL005ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[**GECL005ALIMINLIH01>0** AND **GECL005OCCPRESEM01=0**] in the specific time interval
13	GECL005THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
14	GECL005THCLTHSOH01	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 4-6: Class #19 - physical measurement and HQDS variables.

	Label	Room 21 (F1)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.20 - Data received by DOKI - Data Transmission = 5 minutes.
1	GECL006ALILIFLUC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	GECL006ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour.
3	GECL006ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative for the installation.
4	GECL006OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	GECL006ATIROOTEM01	Room Temperature	°C		1		1	
6	GECL006ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
7	GECL006RADMINVEC01	Radiator: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
8	GECL006RADMINVAM01	Radiator: Minutes ON	minutes		1		1	Cumulative in the hour
9	GECL006RADHOUVAM01	Radiator: Hours ON	hours		1		1	Cumulative from the installation
10	GECL006RADPIDORC01	Radiator: Control signal	%		1		1	**Control signal: < 50% R1 = OFF; > 50% R1 = ON**
11	GECL006WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
12	GECL006OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by**.
13	GECL006RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve. **used by IES only to calibrate the building model.**
14	GECL006ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				4	**10**	**0**	**14**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	GECL006ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **GECL006ALIMINLIM01** in the specific time interval
2	GECL006ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **GECL006ATIROOTEM01** in the specific time interval
3	GECL006ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **GECL006ATIROOTES01** in the specific time interval.
4	GECL006OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	[Number of events that **GECL006OCCPRESEM01 > 0**] * 5 [minutes]
5	GECL006RADVALVEH02	Radiator (Valve): Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **GECL006RADMINVAM01** in the specific time interval
6	GECL006WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **GECL006WINWIOPEM01 > 0**] * 5 [minutes]
7	GECL006ALIERGCLH01	Lighting Energy Consumption	kWh	1	1	1		**[GECL006ALIMINLIH01 * TotalWatt]/1000; TotalWatt = (2*2*36W) = 144 [Watt]**
8	GECL006THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[GECL006RADMINVAM01 * NominalPower]/1000; NominalPower = 1649 [Watt]**
9	GECL006ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		[**GECL006ATIROOTEM01 > GECL006ATIROOTEM01**] AND [**GECL006RADMINVAH01>0**]
10	GECL006WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**GECL006WINWIOPEM01>0** AND **GECL006RADMINVAH01>0**]
11	GECL006OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**GECL006OCCROWOWH01<>0**] in the specific time interval
12	GECL006ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[**GECL006ALIMINLIH01>0** AND **GECL006OCCPRESEM01=0**] in the specific time interval
13	GECL006THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
14	GECL006THCLTHSOH01	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 4-7: Class #21 - physical measurement and HQDS variables.

	Label	Room 23 (F1)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.22 - Data received by DOKI - Data Transmission = 5 minutes.
1	GECL007ALILIFLUC01	Lighting: Status Circuit 1	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	GECL007ALIMINLIM01	Lighting: Minutes ON Circuit 1	minutes		1		1	Cumulative in the hour
3	GECL007ALIHOULIM01	Lighting: Hours ON Circuit 1	hours		1		1	Cumulative from the installation
4	GECL007ALILIFLUC02	Lighting: Status Circuit 2	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
5	GECL007ALIMINLIM02	Lighting: Minutes ON Circuit 2	minutes		1		1	Cumulative in the hour
6	GECL007ALIHOULIM02	Lighting: Hours ON Circuit 2	hours		1		1	Cumulative from the installation
7	GECL007OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
8	GECL007ATIROOTEM01	Room Temperature	°C		1		1	
9	GECL007ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
10	GECL007RADMINVEC01	Radiator 1: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
11	GECL007RADMINVAM01	Radiator 1: Minutes ON	minutes		1		1	Cumulative in the hour
12	GECL007RADHOUVAM01	Radiator 1: Hours ON	hours		1		1	Cumulative from the installation
13	GECL007RADMINVEC02	Radiator 2: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
14	GECL007RADMINVAM02	Radiator 2: Minutes ON	minutes		1		1	Cumulative in the hour
15	GECL007RADHOUVAM02	Radiator 2: Hours ON	hours		1		1	Cumulative from the installation
16	GECL007RADPIDORC01	Radiators: Control signal	%		1		1	**PID < 33% R1 & R2 = OFF; 34% < PID < 66% R1 = ON & R2 = OFF; PID > 66% R1 & R2 ON**
17	GECL007WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
18	GECL007OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic**; **1 = manual**; **2 = stand-by**.
19	GECL007RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
20	GECL007RADTHRADS02	Threshold Radiator 2	°C		1		1	Set-Point to switch ON/OFF Valve 2. **used by IES only to calibrate the building model.**
21	GECL007ALIWAITIT01	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'	h	Day	QI	
1	GECL007ALIMINLIH01	Lighting: Minutes ON Circuit 1	minutes	1	1	1	**3**	ABS (last value - first value) of **GECL007ALIMINLIM01** in the specific time interval
2	GECL007ALIMINLIH02	Lighting: Minutes ON Circuit 2	minutes	1	1	1	**3**	ABS (last value - first value) of **GECL007ALIMINLIM02** in the specific time interval
3	GECL007ATIROOTEH01	Room Temperature	°C	1	1	1	**3**	Average among all value of **GECL007ATIROOTEM01** in the specific time interval
4	GECL007ATSPTEMH01	Set-Point Room Temperature	°C	1	1		**2**	Last value of **GECL007ATIROOTES01** in the specific time interval.
5	GECL007OCCPRESEH01	Presence Sensor	minutes	1	1	1	**3**	[Number of events that **GECL007OCCPRESEM01 > 0**] * 5 [minutes]
6	GECL007RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	**3**	ABS (last value - first value) of **GECL007RADMINVAM01** in the specific time interval
7	GECL007RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	**3**	ABS (last value - first value) of **GECL007RADMINVAM02** in the specific time interval
8	GECL007WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	**3**	[Number of events that **GECL007WINWIOPEM01 > 0**] * 5 [minutes]
9	GECL007ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**C1 = (GECL007ALIMINLIH01*TotalWatt_C1)/1000; TotalWatt_C1=(4*2*58W)=464 [W]** **C2 = (GECL007ALIMINLIH02*TotalWatt_C2)/1000; TotalWatt_C2=(4*2*58W)=464 [W]**
10	GECL007THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**Rad1: [GECL007RADMINVAM01 * N.Power_Rad1]/1000; N.Power_Rad1 = 1261 [Watt]** **Rad2: [GECL007RADMINVAM02 * N.Power_Rad2]/1000; NPower_Rad2 = 1358 [Watt]**
10	GECL007ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		[**GECL007ATIROOTEM01>GECL007ATIROOTEM01**] AND [**GECL007RADMINVAH0x>0**], x=1,2
11	GECL007WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**GECL007WINWIOPEM01>0**] AND [**GECL007RADMINVAH01>0 OR GECL007RADMINVAH02>0**]
12	GECL007OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**GECL007OCCROWOWH01<>0**] in the specific time interval
13	GECL007ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[**GECL007ALIMINLIH01>0** OR **GECL007ALIMINLIH02>0**] AND [**GECL007OCCPRESEM01=0**]
14	GECL007THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
15	GECL007THCLTHSOH01	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 4-8: Class #23 - physical measurement and HQDS variables.

	Label	Room 24 (F1)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.23 - Data received by DOKI - Data Transmission = 5 minutes.
1	GECL008ALILIFLUC01	Lighting: Status Circuit 1	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	GECL008ALIMINLIM01	Lighting: Minutes ON Circuit 1	minutes		1		1	Cumulative in the hour
3	GECL008ALIHOULIM01	Lighting: Hours ON Circuit 1	hours		1		1	Cumulative from the installation
4	GECL008ALILIFLUC02	Lighting: Status Circuit 2	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
5	GECL008ALIMINLIM02	Lighting: Minutes ON Circuit 2	minutes		1		1	Cumulative in the hour
6	GECL008ALIHOULIM02	Lighting: Hours ON Circuit 2	hours		1		1	Cumulative from the installation
7	GECL008OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
8	GECL008ATIROOTEM01	Room Temperature	°C		1		1	
9	PVCL006ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
10	GECL008RADMINVEC01	Radiator: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
11	GECL008RADMINVAM01	Radiator: Minutes ON	minutes		1		1	Cumulative in the hour
12	GECL008RADHOUVAM01	Radiator: Hours ON	hours		1		1	Cumulative from the installation
13	GECL008RADPIDORC01	Radiator: Control signal	%		1		1	**Control signal: < 50% R1 = OFF; > 50% R1 = ON**
14	GECL008WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
15	GECL008OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
16	GECL008RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve. **used by IES only to calibrate the building model.**
17	GECL008ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				5	**12**	**0**	**17**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	GECL008ALIMINLIH01	Lighting: Minutes ON Circuit 1	minutes	1	1	1	3	ABS (last value - first value) of **GECL008ALIMINLIM01** in the specific time interval
2	GECL008ALIMINLIH02	Lighting: Minutes ON Circuit 2	minutes	1	1	1	3	ABS (last value - first value) of **GECL008ALIMINLIM02** in the specific time interval
3	GECL008ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **GECL008ATIROOTEM01** in the specific time interval
4	GECL008ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **GECL008ATIROOTES01** in the specific time interval.
5	GECL008OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	[Number of events that **GECL008OCCPRESEM01 > 0**] * 5 [minutes]
6	GECL008RADMINVAH01	Radiator (Valve): Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **GECL008RADMINVAM01** in the specific time interval
7	GECL008WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **GECL008WINWIOPEM01 > 0**] * 5 [minutes]
8	GECL008ALIERGCLH01	Lighting Energy Consumption	kWh	1	1	1		**[Circuit1] + [Circuit2]. TotalWatt = (4*2*58W) = 464 [Watt];** **C1 = [GECL008ALIMINLIH01 * TotalWatt_C1]/1000; TotalWatt_C1 = 232 [Watt]** **C2 = [GECL008ALIMINLIH02 * TotalWatt_C2]/1000; TotalWatt_C2 = 232 [Watt]**
9	GECL008THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[GECL008RADMINVAM01 * NominalPower]/1000; NominalPower = 1164 [Watt]**
10	GECL008ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		[**GECL008ATIROOTEM01 > GECL008ATIROOTEM01**] AND [**GECL008RADMINVAH01>0**]
11	GECL008WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**GECL008WINWIOPEM01>0**] AND [**GECL008RADMINVAH01>0**] in the specific interval
12	GECL008OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**GECL008OCCROWOWH01<>0**] in the specific time interval
13	GECL008ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[**GECL008ALIMINLIH01>0** OR **GECL008ALIMINLIH02>0**] AND [**GECL008OCCPRESEM01=0**]
14	GECL008THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
15	GECL008THCLTHSOH01	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 4-9: Class #24 - physical measurement and HQDS variables.

	Label	Room 25 (F1)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.24 - Data received by DOKI - Data Transmission = 5 minutes.
1	GECL009ALILIFLUC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	GECL009ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour.
3	GECL009ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative for the installation.
4	GECL009OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	GECL009ATIROOTEM01	Room Temperature	°C		1		1	
6	GECL009ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
7	GECL009RADMINVEC01	Radiator: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
9	GECL009RADMINVAM01	Radiator: Minutes ON	minutes		1		1	Cumulative in the hour
10	GECL009RADHOUVAM01	Radiator: Hours ON	hours		1		1	Cumulative from the installation
8	GECL009RADPIDORC01	Radiator: Control signal	%		1		1	**Control signal: < 50% R1 = OFF; > 50% R1 = ON**
11	GECL009WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
12	GECL009OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by**.
13	GECL009RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve. **used by IES only to calibrate the building model.**
14	GECL009ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				4	**10**	**0**	**14**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	GECL009ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **GECL009ALIMINLIM01** in the specific time interval
2	GECL009ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **GECL009ATIROOTEM01** in the specific time interval
3	GECL009ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **GECL009ATIROOTES01** in the specific time interval.
4	GECL009OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	[Number of events that **GECL009OCCPRESEM01 > 0**] * 5 [minutes]
5	GECL009RADMINVAH01	Radiator (Valve): Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **GECL009RADMINVAM01** in the specific time interval
6	GECL009WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **GECL009WINWIOPEM01 > 0**] * 5 [minutes]
7	GECL009ALIERGCLH01	Lighting Energy Consumption	kWh	1	1	1		**[GECL009ALIMINLIH01 * TotalWatt]/1000; Totalwatt (1* 18W) = 18 [Watt]**
8	GECL009THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[(GECL009RADMINVAM01) * NominalPower]/1000; NominalPower = 194 [Watt]**
9	GECL009ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		[**GECL009ATIROOTEM01 > GECL009ATIROOTEM01**] AND [**GECL009RADMINVAH01>0**]
10	GECL009WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**GECL009WINWIOPEM01>0**] AND [**GECL009RADMINVAH01>0**] in the specific interval
11	GECL009OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**GECL009OCCROWOWH01<>0**] in the specific time interval
12	GECL009ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[**GECL009ALIMINLIH01>0**] AND [**GECL009OCCPRESEM01=0**] in the specific time interval
13	GECL009THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
14	GECL009THCLTHSOH01	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 4-10: Class #25 - physical measurement and HQDS variables.

	Label	Room 26 (F1)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.25 - Data received by DOKI - Data Transmission = 5 minutes.
1	GECL010ALILIFLUC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	GECL010ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour.
3	GECL010ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative for the installation.
4	GECL010OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	GECL010ATIROOTEM01	Room Temperature	°C		1		1	
6	GECL010ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
7	GECL010RADMINVEC01	Radiator: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
8	GECL010RADMINVAM01	Radiator: Minutes ON	minutes		1		1	Cumulative in the hour
9	GECL010RADHOUVAM01	Radiator: Hours ON	hours		1		1	Cumulative from the installation
10	GECL010RADPIDORC01	Radiator: Control signal	%		1		1	**Control signal: < 50% R1 = OFF; > 50% R1 = ON**
11	GECL010WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
12	GECL010OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by**.
13	GECL010RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve. **used by IES only to calibrate the building model.**
14	GECL010ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				4	**10**	**0**	**14**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	GECL010ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **GECL010ALIMINLIM01** in the specific time interval
2	GECL010ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **GECL010ATIROOTEM01** in the specific time interval
3	GECL010ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **GECL010ATIROOTES01** in the specific time interval.
4	GECL010OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	[Number of events that **GECL010OCCPRESEM01 > 0**] * 5 [minutes]
5	GECL010RADMINVAH01	Radiator (Valve): Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **GECL010RADMINVAM01** in the specific time interval
6	GECL010WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **GECL010WINWIOPEM01 > 0**] * 5 [minutes]
7	GECL010ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**[GECL010ALIMINLIH01 * TotalWatt]/1000; Total Watt (1*18W) = 18 [Watt]**
8	GECL010THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[GECL010RADMINVAM01 * NominalPower]/1000]; NominalPower = 291 [Watt]**
9	GECL010ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		[**GECL010ATIROOTEM01 > GECL010ATIROOTEM01**] AND [**GECL010RADMINVAH01>0**]
10	GECL010WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**GECL010WINWIOPEM01>0**] AND [**GECL010RADMINVAH01>0**] in the specific interval
11	GECL010OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**GECL010OCCROWOWH01<>0**] in the specific time interval
12	GECL010ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[**GECL010ALIMINLIH01>0**] AND [**GECL010OCCPRESEM01=0**] in the specific time interval
13	GECL010THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
14	GECL010THCLTHSOH01	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 4-11: Class #26 - physical measurement and HQDS variables.

	Label	Room 27 (F1)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.26 - Data received by DOKI - Data Transmission = 5 minutes.
1	GECL011ALILIFLUC01	Lighting: Status Circuit 1	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	GECL011ALIMINLIM01	Lighting: Minutes ON Circuit 1	minutes		1		1	Cumulative in the hour
3	GECL011ALIHOULIM01	Lighting: Hours ON Circuit 1	hours		1		1	Cumulative from the installation
4	GECL011ALILIFLUC02	Lighting: Status Circuit 2	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
5	GECL011ALIMINLIM02	Lighting: Minutes ON Circuit 2	minutes		1		1	Cumulative in the hour
6	GECL011ALIHOULIM02	Lighting: Hours ON Circuit 2	hours		1		1	Cumulative from the installation
7	GECL011OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
8	GECL011ATIROOTEM01	Room Temperature	°C		1		1	
9	GECL011ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
10	GECL011RADMINVEC01	Radiator 1: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
11	GECL011RADMINVAM01	Radiator 1: Minutes ON	minutes		1		1	Cumulative in the hour
12	GECL011RADHOUVAM01	Radiator 1: Hours ON	hours		1		1	Cumulative from the installation
13	GECL011RADMINVEC02	Radiator 2: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
14	GECL011RADMINVAM02	Radiator 2: Minutes ON	minutes		1		1	Cumulative in the hour
15	GECL011RADHOUVAM02	Radiator 2: Hours ON	hours		1		1	Cumulative from the installation
16	GECL011RADPIDORC01	Radiators: Control signal	%		1		1	**PID < 33% R1 & R2 = OFF; 34% < PID < 66% R1 = ON & R2 = OFF; PID > 66% R1 & R2 ON**
17	GECL011WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
18	GECL011OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
19	GECL011RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve. **used by IES only to calibrate the building model.**
20	GECL011RADTHRADS02	Threshold Radiator 2	°C		1		1	Set-Point to switch ON/OFF Valve. **used by IES only to calibrate the building model.**
21	GECL011ALIWAITIT01	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) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	GECL011ALIMINLIH01	Lighting: Minutes ON Circuit 1	minutes	1	1	1	3	ABS (last value - first value) of **GECL011ALIMINLIM01** in the specific time interval
2	GECL011ALIMINLIH02	Lighting: Minutes ON Circuit 2	minutes	1	1	1	3	ABS (last value - first value) of **GECL011ALIMINLIM02** in the specific time interval
3	GECL011ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **GECL011ATIROOTEM01** in the specific time interval
4	GECL011ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **GECL011ATIROOTES01** in the specific time interval.
5	GECL011OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	[Number of events that **GECL011OCCPRESEM01 > 0**] * 5 [minutes]
6	GECL011RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	3	ABS (last value - first value) of **GECL011RADMINVAM01** in the specific time interval
7	GECL011RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	3	ABS (last value - first value) of **GECL011RADMINVAM02** in the specific time interval
8	GECL011WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **GECL011WINWIOPEM01 > 0**] * 5 [minutes]
9	GECL011ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**C1 = [GECL011ALIMINLIH01 * TotalWatt_C1]/1000; TotalWatt_C1 = 348 [Watt]** **C2 = [GECL011ALIMINLIH02 * TotalWatt_C2]/1000; TotalWatt_C2 = 348 [Watt]**
10	GECL011THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[(GECL011RADMINVAM01+GECL011RADMINVAM02)*N.Power]/1000; N.Power=1164 [W]**
11	GECL011ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		[**GECL011ATIROOTEM01>GECL011ATIROOTEM01**] AND [**GECL011RADMINVAH0x>0**], x=1,2
12	GECL011WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**GECL011WINWIOPEM01>0**] AND [**GECL011RADMINVAH0x>0**], x=1,2
13	GECL011OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**GECL011OCCROWOWH01<>0**] in the specific time interval
14	GECL011ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[**GECL011ALIMINLIH01>0** OR **GECL011ALIMINLIH02>0**] AND [**GECL011OCCPRESEM01=0**]
15	GECL011THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
16	GECL011THCLTHSOH01	Last time heating system OFF	timestamp			1		The last time the heating system is turned OFF during the whole day.
			TOTALS	**14**	**14**	**15**	**23**	
				66				

Figure 4-12: Class #27 - physical measurement and HQDS variables.

	Label	Nursery 7 + 9 (GF)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.28 - Data received by DOKI - Data Transmission = 5 minutes.
1	GECL012ALILIFLUC01	Lighting: Status Circuit 1	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	GECL012ALIMINLIM01	Lighting: Minutes ON Circuit 1	minutes		1		1	Cumulative in the hour
3	GECL012ALIHOULIM01	Lighting: Hours ON Circuit 1	hours		1		1	Cumulative from the installation
4	GECL012ALILIFLUC02	Lighting: Status Circuit 2	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
5	GECL012ALIMINLIM02	Lighting: Minutes ON Circuit 2	minutes		1		1	Cumulative in the hour
6	GECL012ALIHOULIM02	Lighting: Hours ON Circuit 2	hours		1		1	Cumulative from the installation
7	GECL012OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
8	GECL012ATIROOTEM01	Room Temperature	°C		1		1	
9	GECL012ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
10	GECL012RADMINVEC01	Radiator: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
11	GECL012RADMINVAM01	Radiator: Minutes ON	minutes		1		1	Cumulative in the hour
12	GECL012RADHOUVAM01	Radiator: Hours ON	hours		1		1	Cumulative from the installation
13	GECL012RADPIDORC01	Radiator: Control signal	%		1		1	**Control signal: < 50% R1 = OFF; > 50% R1 = ON**
14	GECL012WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
15	GECL012OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
16	GECL012RADTHRADS01	Threshold Radiator	°C		1		1	Set-Point to switch ON/OFF Valve. **used by IES only to calibrate the building model.**
17	GECL012ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				5	**12**	**0**	**17**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	GECL012ALIMINLIH01	Lighting: Minutes ON Circuit 1	minutes	1	1	1	3	ABS (last value - first value) of **GECL012ALIMINLIM01** in the specific time interval
2	GECL012ALIMINLIH02	Lighting: Minutes ON Circuit 2	minutes	1	1	1	3	ABS (last value - first value) of **GECL012ALIMINLIM02** in the specific time interval
3	GECL012ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **GECL012ATIROOTEM01** in the specific time interval
4	GECL012ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **GECL012ATIROOTES01** in the specific time interval.
5	GECL012OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	[Number of events that **GECL012OCCPRESEM01 > 0**] * 5 [minutes]
6	GECL012RADMINVAH01	Radiator: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **GECL012RADMINVAM01** in the specific time interval
7	GECL012WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **GECL012WINWIOPEM01 > 0**] * 5 [minutes]
8	GECL012ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**[Circuit1] + [Circuit2]. TotalWatt = 254 [Watt]** **C1 = [GECL012ALIMINLIH01 * TotalWatt_C1]/1000; TotalWatt_C1=(2*3*36W)=236 [Watt]** **C2 = [GECL012ALIMINLIH02 * TotalWatt_C2]/1000; TotalWatt_C2 = (1*18W) = 18 [Watt]**
9	GECL012THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**Rad1 = [GECL012RADMINVAM01 * N.Power]/1000]; N.Power_Rad1 = 2261 [Watt]**
10	GECL012ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		[**GECL012ATIROOTEM01>GECL012ATIROOTEM01**] AND [**GECL012RADMINVAH01>0**]
11	GECL012WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**GECL012WINWIOPEM01>0**] AND [**GECL012RADMINVAH01>0**] in the specific interval
12	GECL012OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**GECL012OCCROWOWH01<>0**] in the specific time interval
13	GECL012ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[**GECL012ALIMINLIH01>0** OR **GECL012ALIMINLIH02>0**] AND [**GECL012OCCPRESEM01=0**]
14	GECL012THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
15	GECL012THCLTHSOH01	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 4-13: Nursery 7 + 9 - physical measurement and HQDS variables.

	Label	fitting room 4A + corridor 6A (with LED)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.12 - Data received by DOKI - Data Transmission = 5 minutes.
1	GECO001ALILILEDC01	Lighting: Status Circuit 1	ON/OFF	1			1	0 = OFF; 1 = ON. type LED
2	GECO001ALIMINLIM01	Lighting: Minutes ON Circuit 1	minutes		1		1	Cumulative in the hour
3	GECO001ALIHOULIM01	Lighting: Hours ON Circuit 1	hours		1		1	Cumulative from the installation
4	GECO001ALILIFLUC02	Lighting: Status Circuit 2	ON/OFF	1			1	0 = OFF; 1 = ON. type LED
5	GECO001ALIMINLIM02	Lighting: Minutes ON Circuit 2	minutes		1		1	Cumulative in the hour
6	GECO001ALIHOULIM02	Lighting: Hours ON Circuit 2	hours		1		1	Cumulative from the installation
7	GECO001OCCPRESEM01	Presence Sensor 1	yes / no	1			1	0 = NO; 1 = YES
8	GECO001OCCPRESEM02	Presence Sensor 2	yes / no	1			1	0 = NO; 1 = YES
8	GECO001ATIROOTEM01	Room Temperature	°C		1		1	
9	GECO001ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
10	GECO001RADMINVEC01	Radiator: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
11	GECO001RADMINVAM01	Radiator: Minutes ON	minutes		1		1	Cumulative in the hour
12	GECO001RADHOUVAM01	Radiator: Hours ON	hours		1		1	Cumulative from the installation
13	GECO001RADPIDORC01	Radiator: Control signal	%		1		1	**Control signal: < 50% R1 = OFF; > 50% R1 = ON**
14	GECO001WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
15	GECO001OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
16	GECO001RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve. **used by IES only to calibrate the building model.**
17	GECO001ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				6	**12**	**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	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	GECO001ALIMINLIH01	Lighting: Minutes ON Circuit 1	minutes	1	1	1	3	ABS (last value - first value) of **GECO001ALIMINLIM01** in the specific time interval
2	GECO001ALIMINLIH02	Lighting: Minutes ON Circuit 2	minutes	1	1	1	3	ABS (last value - first value) of **GECO001ALIMINLIM02** in the specific time interval
3	GECO001ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **GECO001ATIROOTEM01** in the specific time interval
4	GECO001ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **GECO001ATIROOTES01** in the specific time interval.
5	GECO001OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	Averaged value [Number of events (**GECO001OCCPRESEM01>0 + GECO001OCCPRESEM02>0**)] *** 5 [minutes]**, in the interval
6	GECO001RADMINVAH01	Radiator: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **GECO001RADMINVAM01** in the specific time interval
7	GECO001WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **GECO001WINWIOPEM01 > 0**] * 5 [minutes]
8	GECO001ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**[Circuit 1]+[Circuit 2]. TotalWatt = 180 [Watt]** **C1 = [GECO001ALIMINLIH01 * TotalWatt_C1]/1000; TotalWatt_C1 = (1*60W) = 60 [Watt]** **C2 = [GECO001ALIMINLIH02 * TotalWatt_C2]/1000; TotalWatt_C2 = (4*30W) = 120 [Watt]**
9	GECO001THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[GECO001RADMINVAM01 * NominalPower]/1000]; NominalPower = 2261 [Watt]**
10	GECO001ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		[**GECO001ATIROOTEM01>GECO001ATIROOTEM01**] AND [**GECO001RADMINVAH01>0**]
11	GECO001WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**GECO001WINWIOPEM01>0**] AND [**GECO001RADMINVAH01>0**] in the specific interval
12	GECO001OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**GECO001OCCROWOWH01<>0**] in the specific time interval
13	GECO001ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[**GECO001ALIMINLIH01>0** OR **GECO001ALIMINLIH02>0**] AND [**GECO001OCCPRESEH01=0**]
14	GECO001THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
15	GECO001THCLTHSOH01	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 4-14: fitting room 4A + corridor 6A - physical measurement and HQDS variables.

	Label	Stairs	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.14 - Data received by DOKI - Data Transmission = 5 minutes.
1	GECO002ALILIFLUC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	GECO002ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour
3	GECO002ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative from the installation
4	GECO002OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	GECO002ATIROOTEM01	Room Temperature	°C		1		1	
6	GECO002ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
7	GECO002RADMINVEC01	Radiator 1: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
8	GECO002RADMINVAM01	Radiator 1: Minutes ON	minutes		1		1	Cumulative in the hour
9	GECO002RADHOUVAM01	Radiator 1: Hours ON	hours		1		1	Cumulative from the installation
10	GECO002RADMINVEC02	Radiator 2: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
11	GECO002RADMINVAM02	Radiator 2: Minutes ON	minutes		1		1	Cumulative in the hour
12	GECO002RADHOUVAM02	Radiator 2: Hours ON	hours		1		1	Cumulative from the installation
13	GECO002RADPIDORC01	Radiators: Control signal	%		1		1	**PID < 33% R1 & R2 = OFF; 34% < PID < 66% R1 = ON & R2 = OFF; PID > 66% R1 & R2 ON**
14	GECO002WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
15	GECO002OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
16	GECO002RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
17	GECO002RADTHRADS02	Threshold Radiator 2	°C		1		1	Set-Point to switch ON/OFF Valve 2. **used by IES only to calibrate the building model.**
17	GECO002ALIWAITIT01	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	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	GECO002ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **GECO002ALIMINLIM01** in the specific time interval
2	GECO002ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **GECO002ATIROOTEM01** in the specific time interval
3	GECO002ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **GECO002ATIROOTES01** in the specific time interval.
4	GECO002OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	[Number of events that **GECO002OCCPRESEM01 > 0**] * 5 [minutes]
5	GECO002RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	3	ABS (last value - first value) of **GECO002RADMINVAM01** in the specific time interval
6	GECO002RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	3	ABS (last value - first value) of **GECO002RADMINVAM02** in the specific time interval
7	GECO002WINWIOPEH02	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **GECO002WINWIOPEM01 > 0**] * 5 [minutes]
8	GECO002ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**[GECO002ALIMINLIH01 *T.Watt]/1000; T.Watt=[(2*2*36)=144]+[(3*2*36)=216]=360 [W]**
9	GECO002THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[Radiator1] + [Radiator2]. TotalWatt = (2*1547W) = 3094 [Watt]; [(GECO002RADMINVAM01+GECO002RADMINVAM02)*N.Power]/1000; N.Power=1547 [W]**
10	GECO002ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		[**GECO002ATIROOTEM01>GECO002ATIROOTEM01**] AND [**GECO002RADMINVAH0x>0**], x=1,2
11	GECO002WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**GECO002WINWIOPEM01>0**] AND [**GECO002RADMINVAH0x>0**], x = 1, 2
12	GECO002OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**GECO002OCCROWOWH01<>0**] in the specific time interval
13	GECO002ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[**GECO002ALIMINLIH01>0**] AND [**GECO002OCCPRESEM01=0**] in the specific time interval
14	GECO002THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
15	GECO002THCLTHSOH01	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: Stairs - physical measurement and HQDS variables.

	Label	Corridor 22 (with LED)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.21 - Data received by DOKI - Data Transmission = 5 minutes.
1	GECO003ALILILEDC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type LED
2	GECO003ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour
3	GECO003ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative from the installation
4	GECO003OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	GECO003ATIROOTEM01	Room Temperature	°C		1		1	
6	GECO003ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
7	GECO003RADMINVEC01	Radiator 1: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
8	GECO003RADMINVAM01	Radiator 1: Minutes ON	minutes		1		1	Cumulative in the hour
9	GECO003RADHOUVAM01	Radiator 1: Hours ON	hours		1		1	Cumulative from the installation
10	GECO003RADMINVEC02	Radiator 2: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
11	GECO003RADMINVAM02	Radiator 2: Minutes ON	minutes		1		1	Cumulative in the hour
12	GECO003RADHOUVAM02	Radiator 2: Hours ON	hours		1		1	Cumulative from the installation
13	GECO003RADMINVEC03	Radiator 3: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
14	GECO003RADMINVAM03	Radiator 3: Minutes ON	minutes		1		1	Cumulative in the hour
15	GECO003RADHOUVAM03	Radiator 3: Hours ON	hours		1		1	Cumulative from the installation
16	GECO003RADPIDORC01	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	GECO003WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
18	GECO003OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
19	GECO003RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve 1. **used by IES only to calibrate the building model.**
20	GECO003RADTHRADS02	Threshold Radiator 2	°C		1		1	Set-Point to switch ON/OFF Valve 2. **used by IES only to calibrate the building model.**
21	GECO003RADTHRADS03	Threshold Radiator 3	°C		1		1	Set-Point to switch ON/OFF Valve 3. **used by IES only to calibrate the building model.**
22	GECO003ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				6	**16**	**0**	**22**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	GECO003ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **GECO003ALIMINLIM01** in the specific time interval
2	GECO003ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **GECO003ATIROOTEM01** in the specific time interval
3	GECO003ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **GECO003ATIROOTES01** in the specific time interval.
4	GECO003OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	[Number of events that **GECO003OCCPRESEM01 > 0**] * 5 [minutes], in the specific time interval
5	GECO003RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	3	ABS (last value - first value) of **GECO003RADMINVAM01** in the specific time interval
6	GECO003RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	3	ABS (last value - first value) of **GECO003RADMINVAM02** in the specific time interval
7	GECO003RADMINVAH03	Radiators: Minutes ON Valve 3	minutes	1	1	1	3	ABS (last value - first value) of **GECO003RADMINVAM03** in the specific time interval
8	GECO003WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **GECO003WINWIOPEM01 > 0**] * 5 [minutes], in the specific time interval
9	GECO003ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**[GECO003ALIMINLIH01 * TotalWatt]/1000; Total Watt = (10*30W) = 300 [Watt]**
10	GECO003THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[Σ(GECO003RADMINVAM0x, x=1,2,3) * N.Power]/1000; N.Power = 1190 [Watt]**
11	GECO003ATITHTSPH01	Tamb>Set-point & Heating ON	events	1	1	1		[**GECO003ATIROOTEM01>GECO003ATIROOTEM01**] AND [**GECO003RADMINVAH0x>0 >0**],x=1,3
12	GECO003WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**GECO003WINWIOPEM01>0**] AND [**GECO003RADMINVAH0x>0**], x=1,2,3
13	GECO003OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**GECO003OCCROWOWH01<>0**] in the specific time interval
14	GECO003ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[**GECO003ALIMINLIH01>0**] AND [**GECO003OCCPRESEM01=0**] in the specific time interval
15	GECO003THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
16	GECO003THCLTHSOH01	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: Stairs - physical measurement and HQDS variables.

	Label	Laundry 2 + Corridor 3 (GF)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.27 - Data received by DOKI - Data Transmission = 5 minutes.
1	GECO004ALILIFLUC01	Lighting: Status Circuit 1	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	GECO004ALIMINLIM01	Lighting: Minutes ON Circuit 1	minutes		1		1	Cumulative in the hour
3	GECO004ALIHOULIM01	Lighting: Hours ON Circuit 1	hours		1		1	Cumulative from the installation
4	GECO004ALILIFLUC02	Lighting: Status Circuit 2	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
5	GECO004ALIMINLIM02	Lighting: Minutes ON Circuit 2	minutes		1		1	Cumulative in the hour
6	GECO004ALIHOULIM02	Lighting: Hours ON Circuit 2	hours		1		1	Cumulative from the installation
7	GECO004OCCPRESEM01	Presence Sensor 1	yes / no	1			1	0 = NO; 1 = YES
8	GECO004OCCPRESEM02	Presence Sensor 2	yes / no	1			1	0 = NO; 1 = YES
9	GECO004ATIROOTEM01	Room Temperature	°C		1		1	
10	GECO004ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
11	GECO004RADMINVEC01	Radiator: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
12	GECO004RADMINVAM01	Radiator: Minutes ON	minutes		1		1	Cumulative in the hour
13	GECO004RADHOUVAM01	Radiator: Hours ON	hours		1		1	Cumulative from the installation
14	GECO004RADPIDORC01	Radiator: Control signal	%		1		1	**Control signal: < 50% R1 = OFF; > 50% R1 = ON**
15	GECO004WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
16	GECO004OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
17	GECO004RADTHRADS01	Threshold Radiator 1	°C		1		1	Set-Point to switch ON/OFF Valve. **used by IES only to calibrate the building model.**
18	GECO004ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				6	**12**	**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	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	GECO004ALIMINLIH01	Lighting: Minutes ON Circuit 1	minutes	1	1	1	3	ABS (last value - first value) of **GECO004ALIMINLIM01** in the specific time interval
2	GECO004ALIMINLIH02	Lighting: Minutes ON Circuit 2	minutes	1	1	1	3	ABS (last value - first value) of **GECO004ALIMINLIM02** in the specific time interval
3	GECO004ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **GECO004ATIROOTEM01** in the specific time interval
4	GECO004ATSPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **GECO004ATIROOTES01** in the specific time interval.
5	GECO004OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	Avg. value [Nr events (**GECO004OCCPRESEM01>0 +GECO004OCCPRESEM02>0**)] * 5 [minutes]
6	GECO004RADMINVAH01	Radiator: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **GECO004RADMINVAM03** in the specific time interval
7	GECO004WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **GECO004WINWIOPEM01 > 0**] * 5 [minutes]
8	GECO004ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**Circuit1 = [GECO004ALIMINLIH01*TotalWatt_C1]/1000; TotalWatt_C1=(3*2*58W)=348 [W]** **Circuit2 = [GECO004ALIMINLIH02 * TotalWatt_C2]/1000; TotalWatt_C2=(2*2*36W)=144 [W]**
9	GECO004THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[GECO004RADMINVAM01 * NominalPower]/1000]; NominalPower = 582 [Watt]**
10	GECO004ATITHTSPH01	"Tamb>Set-point & Heating ON"	events	1	1	1		[**GECO004ATIROOTEM01>GECO004ATIROOTEM01**] AND [**GECO004RADMINVAH01>0**]
11	GECO004WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**GECO004WINWIOPEM01>0**] AND [**GECO004RADMINVAH01>0**] in the specific interval
12	GECO004OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**GECO004OCCROWOWH01<>0**] in the specific time interval
13	GECO004ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[**GECO004ALIMINLIH01>0 OR GECO004ALIMINLIH02>0**] AND [**GECO004OCCPRESEH01=0**]
14	GECO004THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
15	GECO004THCLTHSOH01	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 4-17: Stairs - physical measurement and HQDS variables.

	Label	WC #4 + #5	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.11 - Data received by DOKI - Data Transmission = 5 minutes.
1	GEWC001ALILIFLUC01	Lighting: Status Circuit 1	ON/OFF	1			1	0 = OFF; 1 = ON. type incandescent
2	GEWC001ALIMINLIM01	Lighting: Minutes ON Circuit 1	minutes		1		1	Cumulative in the hour
3	GEWC001ALIHOULIM01	Lighting: Hours ON Circuit 1	hours		1		1	Cumulative from the installation
4	GEWC001ALILIFLUC02	Lighting: Status Circuit 2	ON/OFF	1			1	0 = OFF; 1 = ON. type incandescent
5	GEWC001ALIMINLIM02	Lighting: Minutes ON Circuit 2	minutes		1		1	Cumulative in the hour
6	GEWC001ALIHOULIM02	Lighting: Hours ON Circuit 2	hours		1		1	Cumulative from the installation
7	GEWC001OCCPRESEM01	Presence Sensor 1	yes / no	1			1	0 = NO; 1 = YES
8	GEWC001OCCPRESEM02	Presence Sensor 2	yes / no	1			1	0 = NO; 1 = YES
9	GEWC001ATIROOTEM01	Room Temperature	°C		1		1	
10	GEWC001ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
11	GEWC001RADMINVEC01	Radiator 1: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
12	GEWC001RADMINVAM01	Radiator 1: Minutes ON	minutes		1		1	Cumulative in the hour
13	GEWC001RADHOUVAM01	Radiator 1: Hours ON	hours		1		1	Cumulative from the installation
14	GEWC001RADMINVEC02	Radiator 2: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
15	GEWC001RADMINVAM02	Radiator 2: Minutes ON	minutes		1		1	Cumulative in the hour
16	GEWC001RADHOUVAM02	Radiator 2: Hours ON	hours		1		1	Cumulative from the installation
17	GEWC001RADPIDORC01	Radiators: Control signal	%		1		1	**PID < 33% R1 & R2 = OFF; 34% < PID < 66% R1 = ON & R2 = OFF; PID > 66% R1 & R2 ON**
18	GEWC001WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
19	GEWC001OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
20	GEWC001RADTHRADS01	Threshold Radiator 1	%		1		1	Set-Point to switch ON/OFF Valve 2. **used by IES only to calibrate the building model.**
21	GEWC001RADTHRADS02	Threshold Radiator 2	%		1		1	Set-Point to switch ON/OFF Valve 2. **used by IES only to calibrate the building model.**
22	GEWC001ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				7	**15**	**0**	**22**	

N	HQDS; High Quality Data Set			15'	h	Day	QI	
1	GEWC001ALIMINLIH01	Lighting: Minutes ON Circuit 1	minutes	1	1	1	3	ABS (last value - first value) of **GEWC001ALIMINLIM01** in the specific time interval
2	GEWC001ALIMINLIH02	Lighting: Minutes ON Circuit 2	minutes	1	1	1	3	ABS (last value - first value) of **GEWC001ALIMINLIM02** in the specific time interval
2	GEWC001ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **GEWC001ATIROOTEM01** in the specific time interval
3	GEWC001ATISPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **GEWC001ATIROOTES01** in the specific time interval.
4	GEWC001OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	Avg. value [Nr. events (**GEWC001OCCPRESEH01>0 + GEWC001OCCPRESEM02>0)**] * 5 [min]
5	GEWC001RADMINVAH01	Radiators: Minutes ON Valve 1	minutes	1	1	1	3	ABS (last value - first value) of **GEWC001RADMINVAM01** in the specific time interval
6	GEWC001RADMINVAH02	Radiators: Minutes ON Valve 2	minutes	1	1	1	3	ABS (last value - first value) of **GEWC001RADMINVAM02** in the specific time interval
7	GEWC001WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **GEWC001WINWIOPEM01 > 0**] * 5 [minutes]
8	GEWC001ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**Circuit1 = ([GEWC001ALIMINLIH01]*[TotalWatt_C1])/1000; TotalWatt=(2*2*36W)=144 [W]** **Circuit2 = ([GEWC001ALIMINLIH02]*[TotalWatt_C2])/1000; TotalWatt=(1*18W)=18 [Watt]**
9	GEWC001THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**Radiator1 = [GEWC001RADMINVAM01 * N.Power]/1000]; N.Power = 1552 [Watt]** **Radiator2 = [GEWC001RADMINVAM02 * N.Power]/1000]; N.Power = 388 [Watt]**
10	GEWC001ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		**GEWC001ATIROOTEM01>GEWC001ATIROOTEM01** AND [**GEWC001RADMINVAH0x>0**], x=1,2
11	GEWC001WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**GEWC001WINWIOPEM01>0**] AND [**GEWC001RADMINVAH0x>0**], x=1,2
12	GEWC001OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**GEWC001OCCROWOWH01<>0**] in the specific time interval
13	GEWC001ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[**GEWC001ALIMINLIH01>0 OR GEWC001ALIMINLIH02>0**] AND [**GEWC001OCCPRESEH01=0**]
14	GEWC001THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
15	GEWC001THCLTHSOH01	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 4-18: WC #4 + #5 - physical measurement and HQDS variables.

	Label	Bathroom 8 (GF)	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.29 - Data received by DOKI - Data Transmission = 5 minutes.
1	GEWC002ALILIFLUC01	Lighting: Status	ON/OFF	1			1	0 = OFF; 1 = ON. type fluorescent
2	GEWC002ALIMINLIM01	Lighting: Minutes ON	minutes		1		1	Cumulative in the hour.
3	GEWC002ALIHOULIM01	Lighting: Hours ON	hours		1		1	Cumulative for the installation.
4	GEWC002OCCPRESEM01	Presence Sensor	yes / no	1			1	0 = NO; 1 = YES
5	GEWC002ATIROOTEM01	Room Temperature	°C		1		1	
6	GEWC002ATIROOTES01	Set-Point Room Temperature	°C		1		1	Current Set-Point of the Room Temperature
7	GEWC002RADMINVEC01	Radiator: status	yes / no	1			1	0 = Valve OFF; 1 = Valve ON
8	GEWC002RADMINVAM01	Radiator: Minutes ON	minutes		1		1	Cumulative in the hour
9	GEWC002RADHOUVAM01	Radiator: Hours ON	hours		1		1	Cumulative from the installation
10	GEWC002RADPIDORC01	Radiator: Control signal	%		1		1	**Control signal: < 50% R1 = OFF; > 50% R1 = ON**
11	GEWC002WINWIOPEM01	Windows: status	close/open	1			1	0 = Windows CLOSED; 1 = Windows OPENED
12	GEWC002OCCROWOWM01	Room Control Status	-		1		1	**0 = automatic; 1 = manual; 2 = stand-by.**
13	GEWC002RADTHRADS01	Threshold Radiator 1	%		1		1	Set-Point to switch ON/OFF Valve. **used by IES only to calibrate the building model.**
14	GEWC002ALIWAITIT01	Waiting Time	minutes		1		1	To switch OFF the lights with no occupancy. **used by IES only to calibrate the model.**
				4	**10**	**0**	**14**	

N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	GEWC002ALIMINLIH01	Lighting: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **GEWC002ALIMINLIM01** in the specific time interval
2	GEWC002ATIROOTEH01	Room Temperature	°C	1	1	1	3	Average among all value of **GEWC002ATIROOTEM01** in the specific time interval
3	GEWC002ATISPTEMH01	Set-Point Room Temperature	°C	1	1		2	Last value of **GEWC002ATIROOTES01** in the specific time interval.
4	GEWC002OCCPRESEH01	Presence Sensor	minutes	1	1	1	3	Averaged value [Number of events **GEWC002OCCPRESEM01>0**] * 5 [minutes]
5	GEWC002RADMINVAH01	Radiator: Minutes ON	minutes	1	1	1	3	ABS (last value - first value) of **GEWC002RADMINVAM01** in the specific time interval
6	GEWC002WINWIOPEH01	Windows: Minutes Opened	minutes	1	1	1	3	[Number of events that **GEWC002WINWIOPEM01 > 0**] * 5 [minutes]
7	GEWC002ALIERGCOH01	Lighting Energy Consumption	kWh	1	1	1		**[GEWC002ALIMINLIH01 * TotalWatt]/1000; TotalWatt = [(1*18W) + (1*18W)] = 36 [Watt]**
8	GEWC002THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1		**[(GEWC002RADMINVAM01) * NominalPower]/1000]; NominalPower = 194 [Watt]**
9	GEWC002ATITHTSPH01	"Tamb > Set-point & Heating ON"	events	1	1	1		[**GEWC002ATIROOTEM01>GEWC002ATIROOTEM01**] AND [**GEWC002RADMINVAH01>0**]
10	GEWC002WINWOAHOH01	"Window Open & Heating ON"	events	1	1	1		[**GEWC002WINWIOPEM01>0**] AND [**GEWC002RADMINVAH01>0**] in the specific interval
11	GEWC002OCCROWOWH01	"BMS not in automatic control"	events	1	1	1		[**GEWC002OCCROWOWH01<>0**] in the specific time interval
12	GEWC002ALILOANOH01	"Light ON & no occupancy"	events	1	1	1		[**GEWC0021ALIMINLIH01>0**] AND [**GEWC002OCCPRESEM01=0**] in the interval
13	GEWC002THCFTHSOH01	First Time heating system ON	timestamp			1		The first time the heating system is turned ON during the whole day.
14	GEWC002THCLTHSOH01	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: Bathroom #8 - physical measurement and HQDS variables.

	Label	Meteo data	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.19 - Data received by DOKI - Data Transmission = 5 minutes.
1	GEPILOTATEEXTTEM01	External Temperature	°C		1		1	Connected to Control Box of Class 19 (F1, with LED)
				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	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	GEPILOTATEEXTTEH01	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 & Thermal Networks	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.30 - Data received by DOKI - Data Transmission = 5 minutes.
1	GEPS001ELCENRGYM01	Electrical Energy (Active)	kWh		1		1	Cumulative from the installation
2	GEPS001ELCPOWERM01	Electrical Power (Active)	Watt		1		1	
3	GEPS001ELCRERGYM01	Reactive Energy	KVarh		1		1	Cumulative from the installation.
4	GEPS001ELCROWERM01	Reactive Power	Kvar		1		1	
5	GEPS001ELCAMPERM01	Electrical Current: Phase 1	Ampere		1		1	It is used only by IES for calibration of the building model
6	GEPS001ELCAMPERM02	Electrical Current: Phase 2	Ampere		1		1	It is used only by IES for calibration of the building model
7	GEPS001ELCAMPERM03	Electrical Current: Phase 3	Ampere		1		1	It is used only by IES for calibration of the building model
8	GEPS001ELCVOLTAM01	Voltage: Phase1	Volt		1		1	It is used only by IES for calibration of the building model
9	GEPS001ELCVOLTAM02	Voltage: Phase2	Volt		1		1	It is used only by IES for calibration of the building model
10	GEPS001ELCVOLTAM03	Voltage: Phase3	Volt		1		1	It is used only by IES for calibration of the building model
	EVO (control module) IP address: 10.0.1.32.							
11	GEPS002THCENRGYM01	Thermal Energy Consumption	kWh		1		1	**1 pulse = 1 kWh. Cumulative from the start.**
				0	11	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	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	GEPS001ELCENRGYH01	Electricity Consumption	kWh	1	1	1	3	(last value - first value) of **GEPS001ELCENRGYM01**. Active Energy
2	GEPS001ELCPOWERH01	Electrical Power	Watt	1	1	1	3	Average among all value of **GEPS001ELCPOWERM01**. Active Power
3	GEPS001ELCROWERH02	Reactive Eenergy	KVarh	1	1	1	3	(last value - first value) of **GEPS001ELCRERGYM01** in the specific time interval
4	GEPS001ELCROWERH01	Reactive Power	Kvar	1	1	1	3	average among all values of **GEPS001ELCROWERM01** in the specific time interval
5	GEPS002THCENRGYH01	Thermal Energy Consumption	kWh	1	1	1	3	ADD **GEPS002THCENRGYM01** over time intervals
6	GEPS001ELCPOMAXH01	MAX Electrical Power	Watt			1		MAX among all value of **GEPS001ELCPOWERM01** in the specific time interval
7	GEPS001ELCROMAXH01	MAX Reactive Electrical Power	Kvar			1		MAX among all value of **GEPS001ELCROWERM01** in the specific time interval
8	GEPS001ELCENRPKH01	Ele Consumption - Peak hours	kWh			1		To be calculated daily
9	GEPS001ELCENOPKH01	Ele Consumption OFF Peak period	kWh			1		To be calculated daily
10	GEPS001ELCTOKPIH01	Ele Consumption Indicator	kWh/m²			1		To be calculated (daily) by VSN: [**GEPS001ELCENRGYH01**]/[School.surface]
11	GEPS001ELCLIKPIH01	Thermal Energy Indicator	kWh/m²			1		To be calculated by (daily) VSN: [**GEPS001THCENRGYH01**]/[School.surface]
			TOTALS	5	5	11	15	
				36				

Figure 4-20: Meteo data and School Electrical & Thermal measurement.

	Label	Pilot: Electrical Measurement	Unit	Dig	Ang	SW	TOTAL	EVO IP address: 10.0.1.31 - Data received by DOKI - Data Transmission = 5 minutes.
1	GEPP001ELCENRGYM01	Pilot Active Energy	kWh		1		**1**	Cumulative from the installation
2	GEPP001ELCPOWERM01	Electrical Power (Active)	Watt		1		**1**	
3	GEPP001ELCRERGYM01	Reactive Energy	KVarh		1		**1**	Cumulative from the installation.
4	GEPP001ELCROWERM01	Reactive Power	KVarh		1		**1**	
5	GEPP001ELCAMPERM01	Electrical Current: Phase 1	Ampere		1		**1**	It is used only by IES for calibration of the building model
6	GEPP001ELCAMPERM02	Electrical Current: Phase 2	Ampere		1		**1**	It is used only by IES for calibration of the building model
7	GEPP001ELCAMPERM03	Electrical Current: Phase 3	Ampere		1		**1**	It is used only by IES for calibration of the building model
8	GEPP001ELCVOLTAM01	Voltage: Phase1	Volt		1		**1**	It is used only by IES for calibration of the building model
9	GEPP001ELCVOLTAM02	Voltage: Phase2	Volt		1		**1**	It is used only by IES for calibration of the building model
10	GEPP001ELCVOLTAM03	Voltage: Phase3	Volt		1		**1**	It is used only by IES for calibration of the building model
				0	**10**	**0**	**10**	

HQDS Calculated Variables								QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day
N	HQDS; High Quality Data Set (Calculated Variables) - QUERY on data received from DOKI with SELECT: 15 minutes / 1 hour / 1 day			15 min	h	Day	QI	QI [%] =[(No. of data received)/(No. of data expected)] for each specific time interval at a frequency of 5 minutes (BEMS).
1	**GEPP001ELCENRGYH01**	Electricity Consumption	kWh	1	1	1	3	[(last - first) value of GEPP001ELCENRGYM01] in the specific time interval
2	**GEPP001ELCPOWERH01**	Electrical Power	Watt	1	1	1	3	**[GEPP001ELCPOWERM01]**
3	**GEPP001ELCRERGYH01**	Reactive Eenergy	KVarh	1	1	1	3	[(last - first) value of [GEPP001ELCRERGYM01] in the specific time interval
4	**GEPP001ELCROWERH01**	Reactive Power	KVarh	1	1	1	3	**[GEPP001ELCROWERM01]**
5	**GEPP001ELCLITOTH01**	Lighting Energy Consumption	kWh	1	1	1		To be calculated daily: [Sum(**PVxxxxxALIERGCLH01**)]. **All classrooms and environments.**
6	**GEPP001ELCLILEDH01**	Pilot LED Lighting Consumption	kWh	1	1	1		To be calculated daily: **[PVCL307ALIERGCLH01+PVCL309ALIERGCLH01)]**
7	**GEPP001ELCLILFLUH01**	Traditional Lighting Consumption	kWh	1	1	1		To be calculated daily: **[GEPP001ELCLITOTH01]** - **[GEPP001ELCLILEDH01]**
8	**GEPP001ELCLILDIMD01**	Lighting Consumption with Dimming	kWh	1	1	1		To be calculated daily: **[PVCL309ALIERGCLH01]**
9	**GEPP001ELCLIKPIH01**	Lighting Energy Indicator	kWh/m²			1		To be calculated daily: **[GEPP001ELCLITOTH01]**/[Pilot.surface]
10	**GEPP001ELCTOKPIH01**	Electrical Energy Indicator	kWh/m²			1		To be calculated daily: **[GEPP001ELCENRGYH01]**/[School.surface]
11	**GEPP001THCHETOTH01**	Thermal Energy Consumption	kWh/m²	1	1	1		To be calculated daily: **[Sum(PVxxxxxTHCENRGYH01)]**
12	**GEPP001THCHEKPIH01**	Thermal Energy Indicator	kWh/m²			1		**To be calculated daily: [GEPP001THCHETOTH01]/[Pilot.surface]**
			TOTALS	**9**	**9**	**12**	**12**	
				42				

Figure 4-21: Pilot Electrical measurement & Energy Indicators.