LOYTEC

ZDANIA
ZINTEGROWANE SYSTEMY AUTOMATYKI I BEZPIECZEŃSTWA BUDYNKÓW

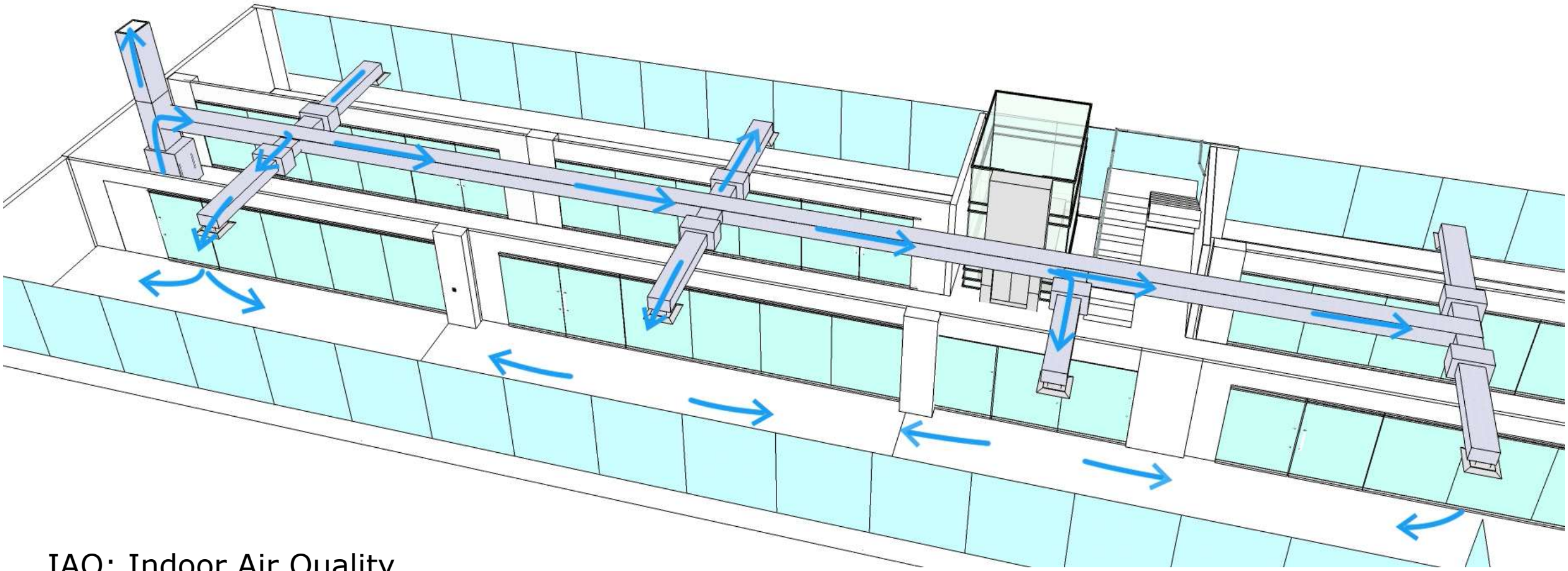
LOYTEC
COMPETENCE CENTER
IN POLAND

Buildings under Control
Symposium

Kraków
7.04.2016

Sterownik wentylacji LIOB-AIR

Wyzwanie: sterowanie jakością powietrza i temperaturą



IAQ: Indoor Air Quality

Ale ...należy spełnić następujące warunki

- Uzyskać najniższe możliwe zużycie energii
- Zapewnić komfortowe warunki środowiska pracy
- Zapewnić nadciśnienie w budynku (0.01 in.wc.)

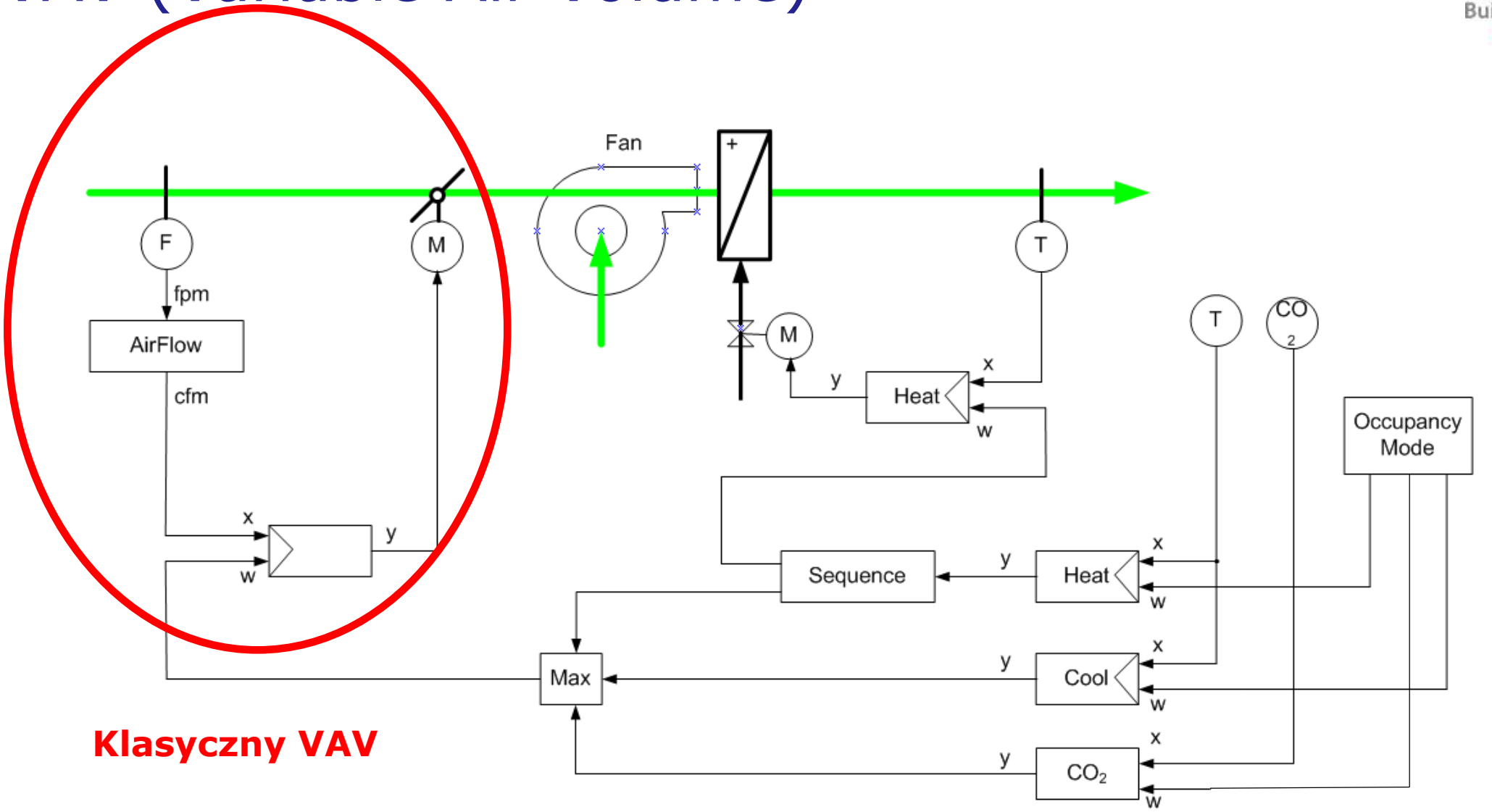
=> **D**emand **C**ontrolled **V**entilation (DCV)

Wentylacja sterowana zapotrzebowaniem

Jak identyfikować zapotrzebowanie ?

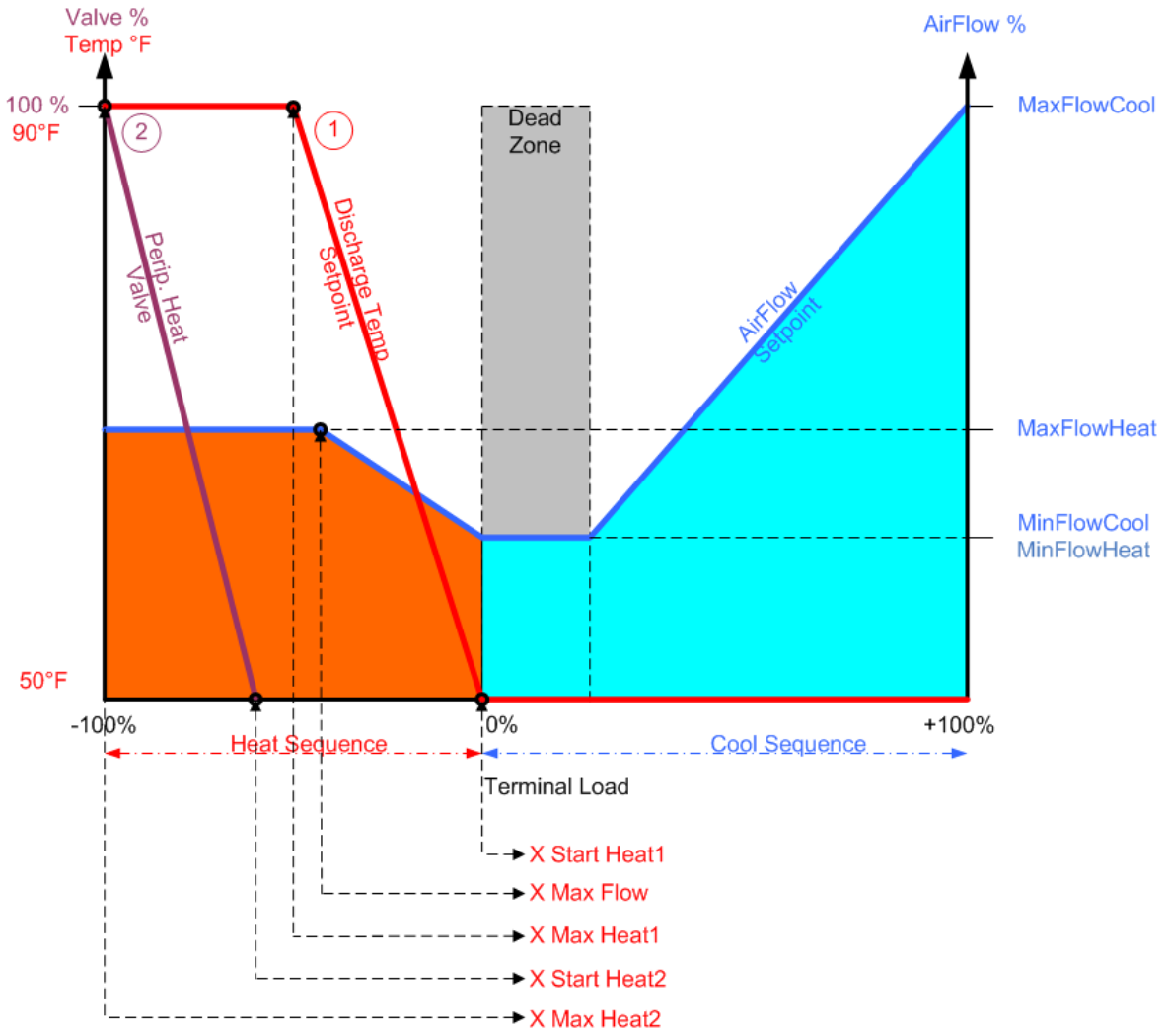
Przez pomiar stężenia CO_2

Schemat sterowania zaawansowanego układu VAV (Variable Air Volume)

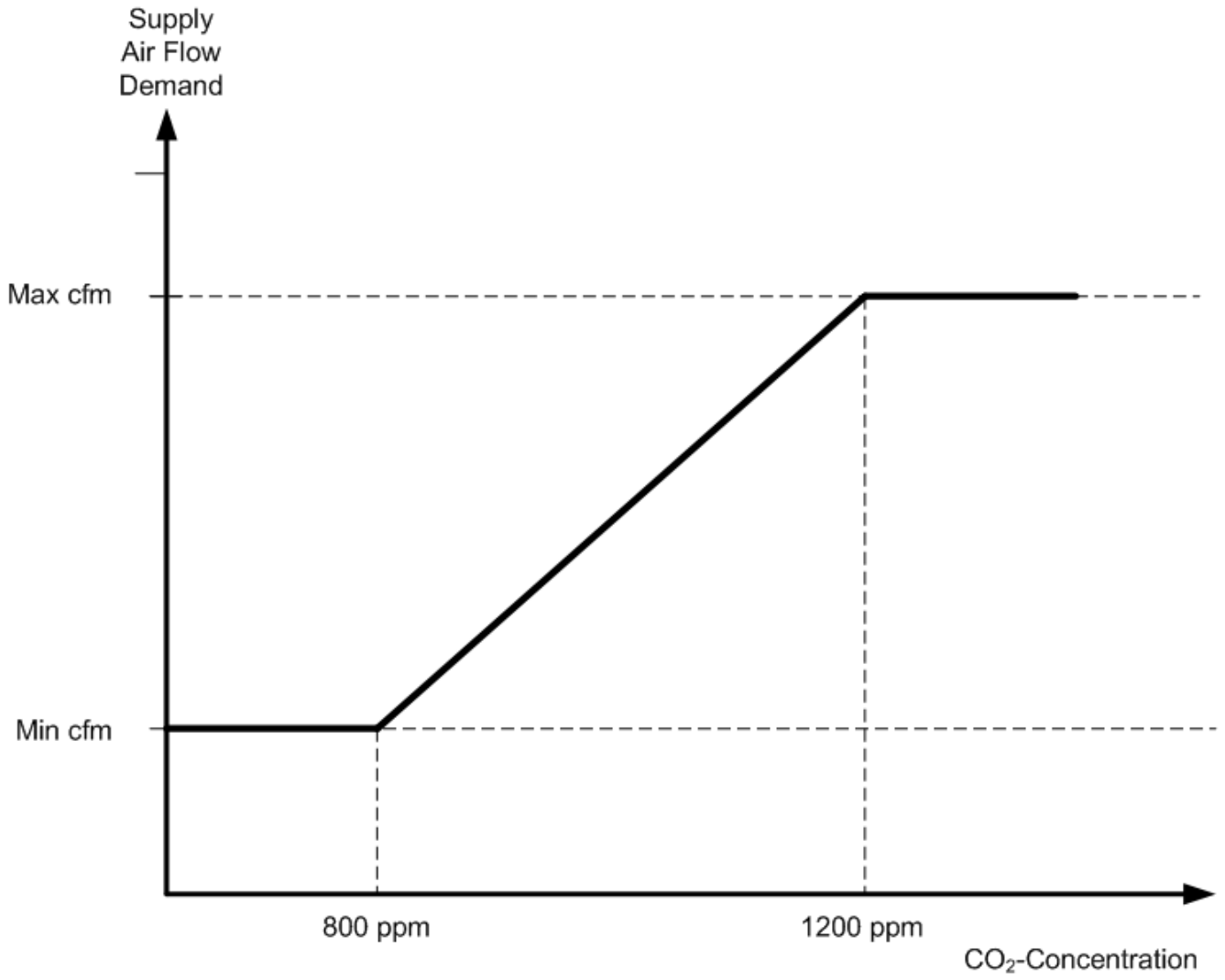


Klasyczny VAV

Sekwencja sterowania temperaturą



Algrytm sterowania CO_2



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Hardware Installation

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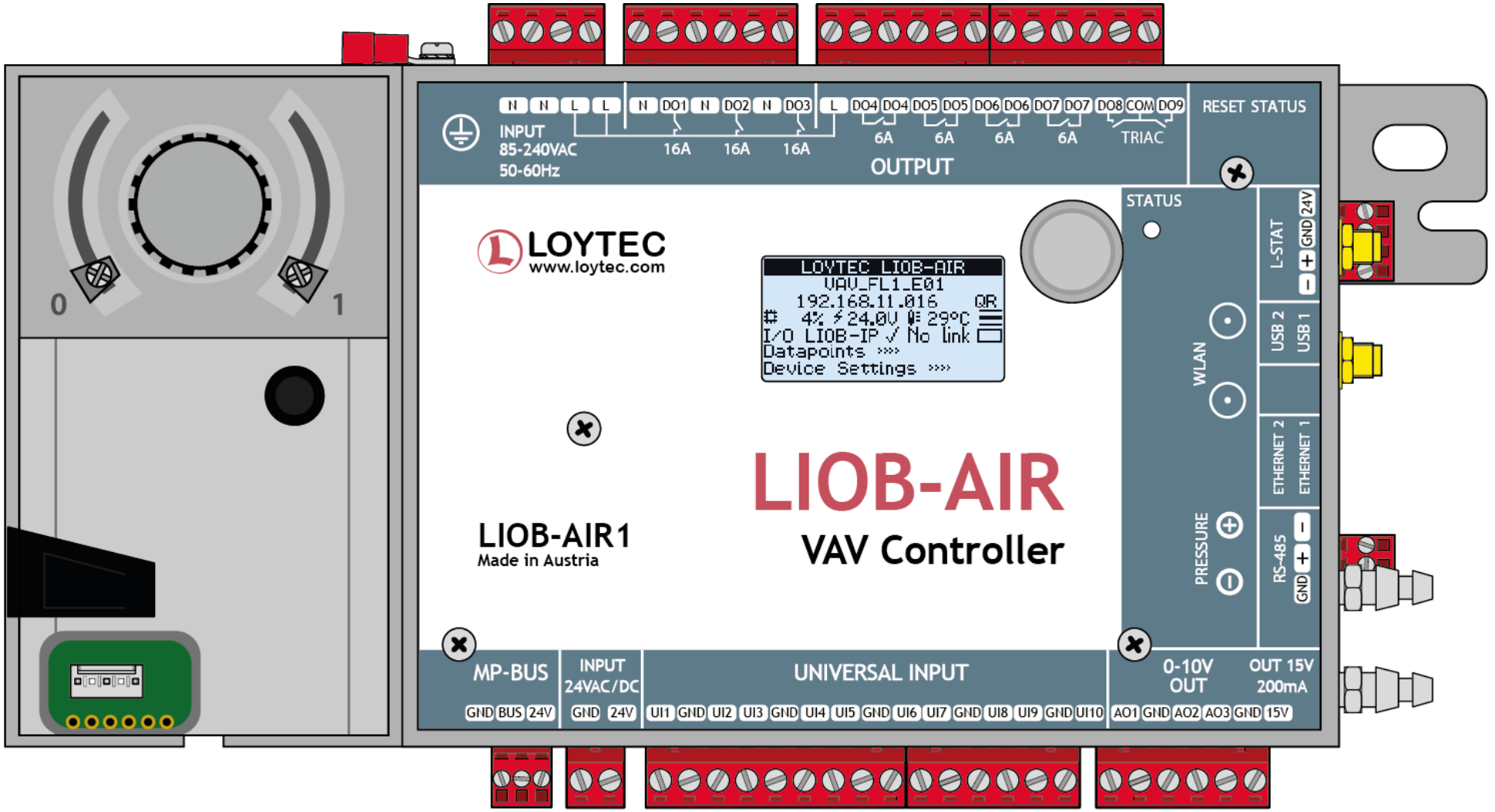
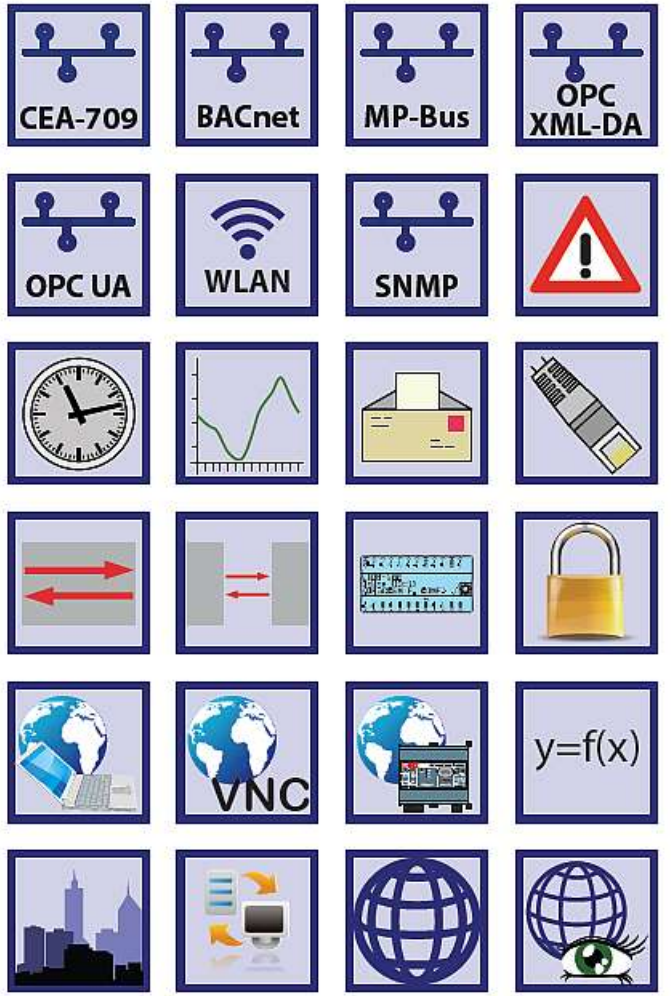
Hardware LIOB-AIRx



Hardware LIOB-AIRx i funkcje



Funkcje technologiczne LIOB-AIR

- Sterowanie przepływem powietrza
- Konfiguracja i kalibracja pomiaru przepływu
- Sterowanie temperaturą powietrza zgodnie z sekwencją
- Sterowanie zależne od obecności
- Operacje grupowe
- Sterowanie nagrzewnicą elektryczną 3 stopniową
- Sterowanie nagrzewnicą wodną
- Sterowanie wentylatorem

Modele sprzętowe

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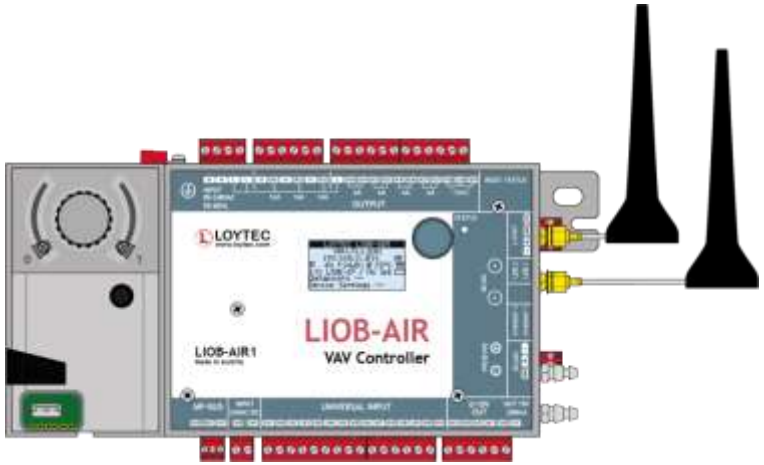
LIOB-AIR1

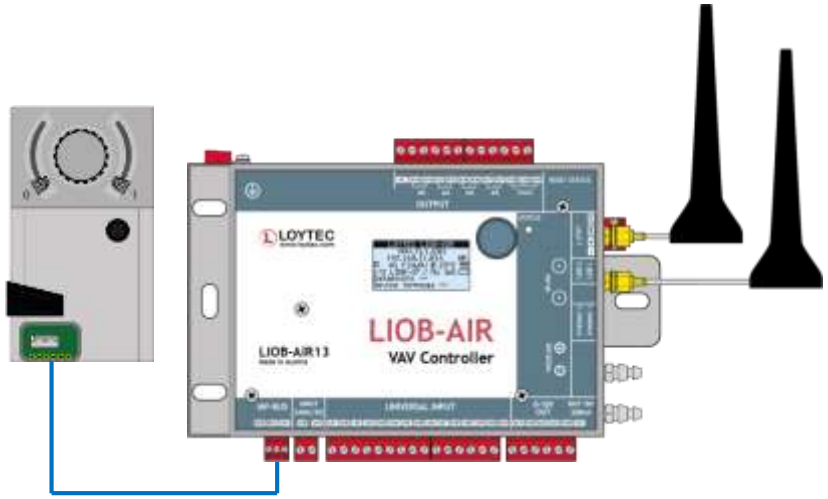


- WLAN
- MS/TP
- 16A relays

LIOB-AIR2

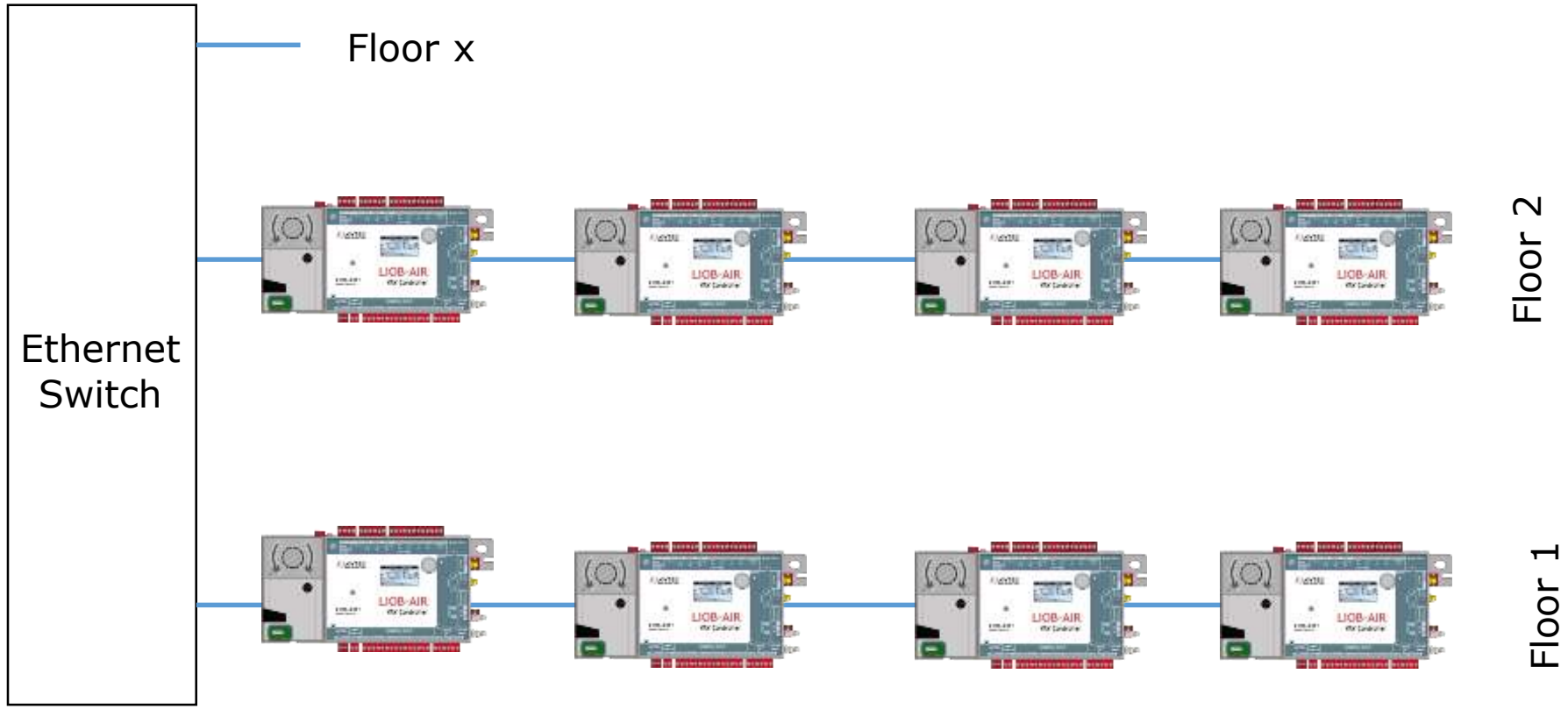
- LIOB-AIR1 but
- No WLAN
- No MS/TP
- No 16A relays

LIOB-AIR13

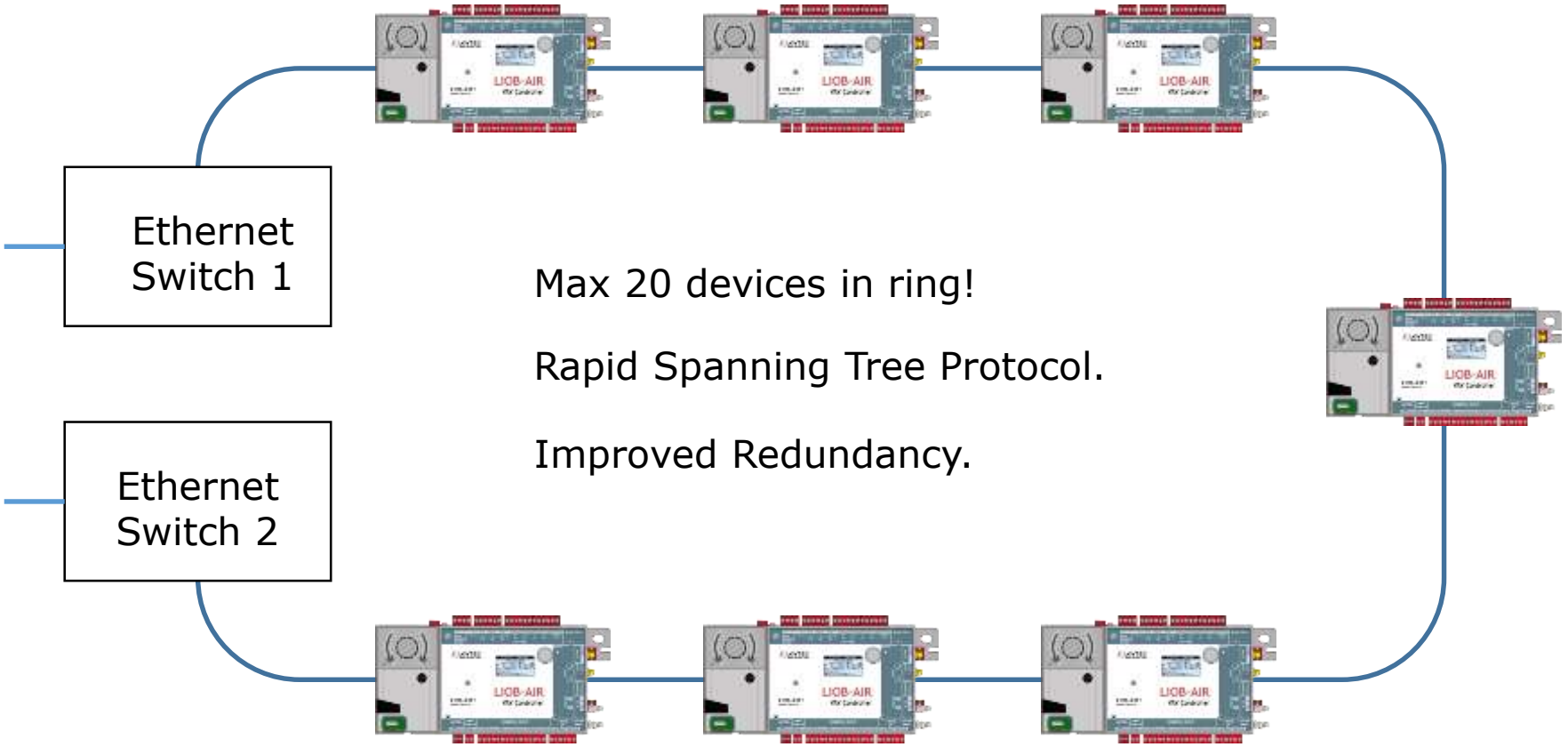


- LIOB-AIR2 but
- With WLAN
- External actuator mounting

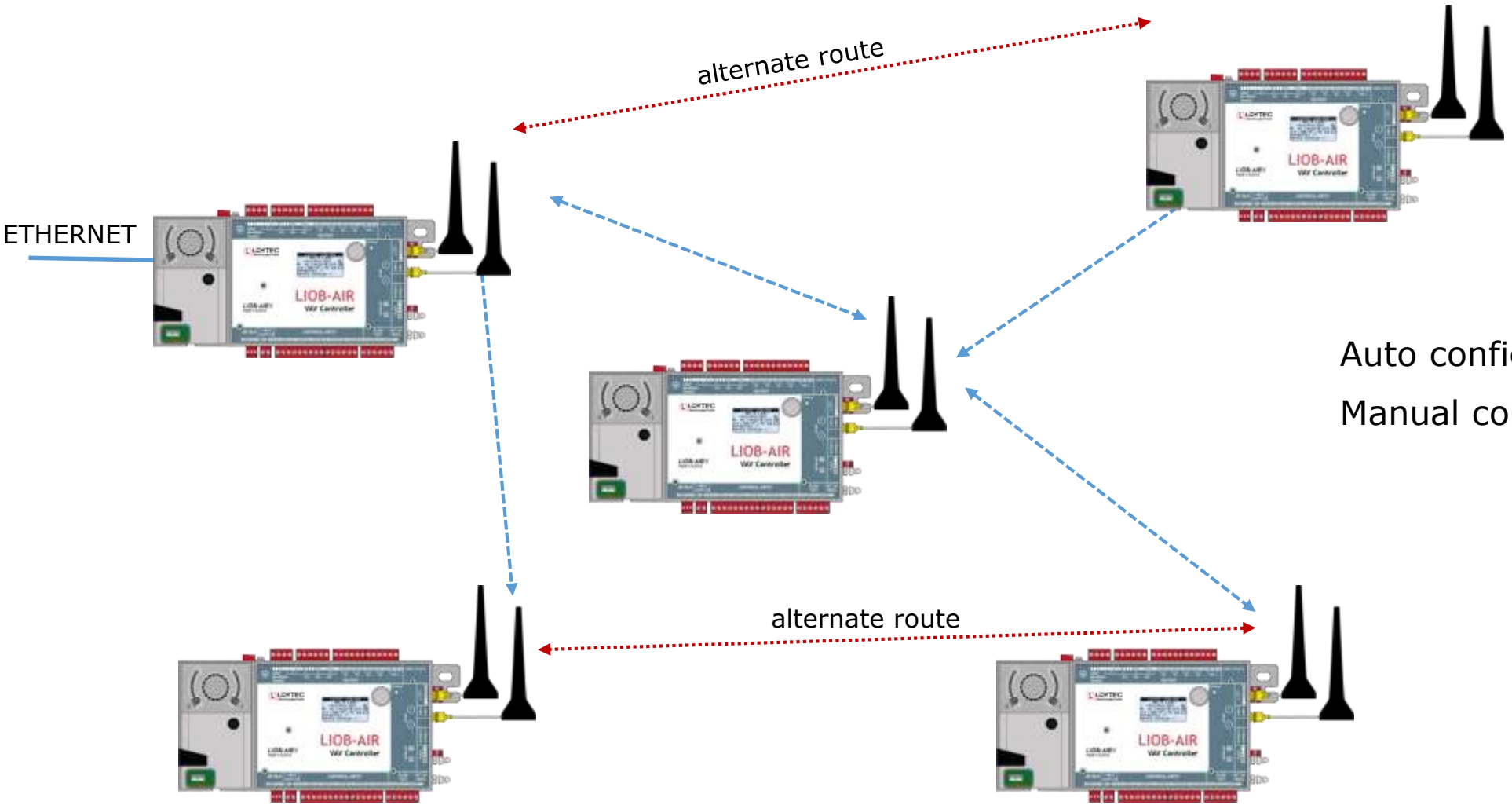
Ethernet Bus Communication



Ethernet Ring Communication



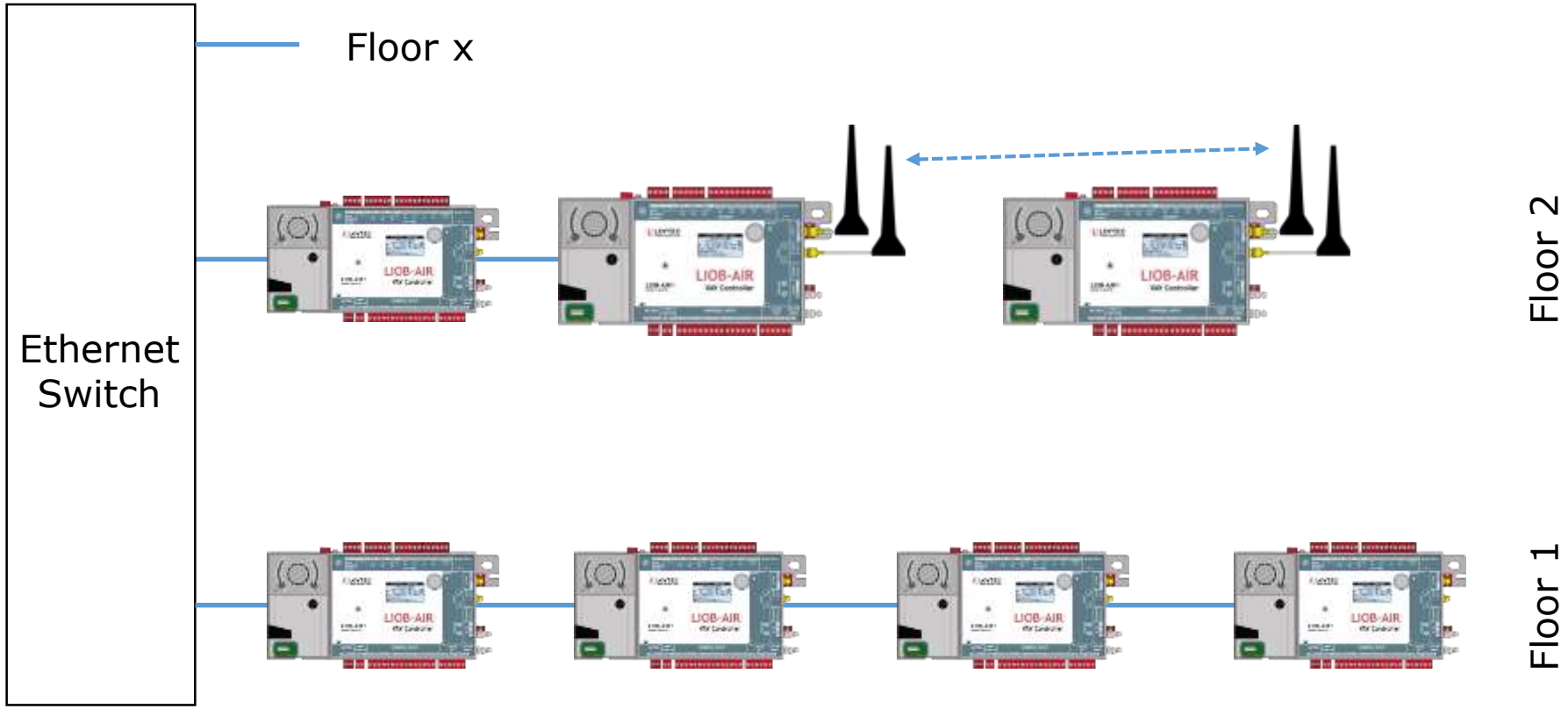
WLAN Mesh Communication



Auto config: max 8 devices

Manual config: max 20 devices

Mixed Ethernet/WLAN Communication



Max 20 devices on bus!

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Interfejsy użytkownika

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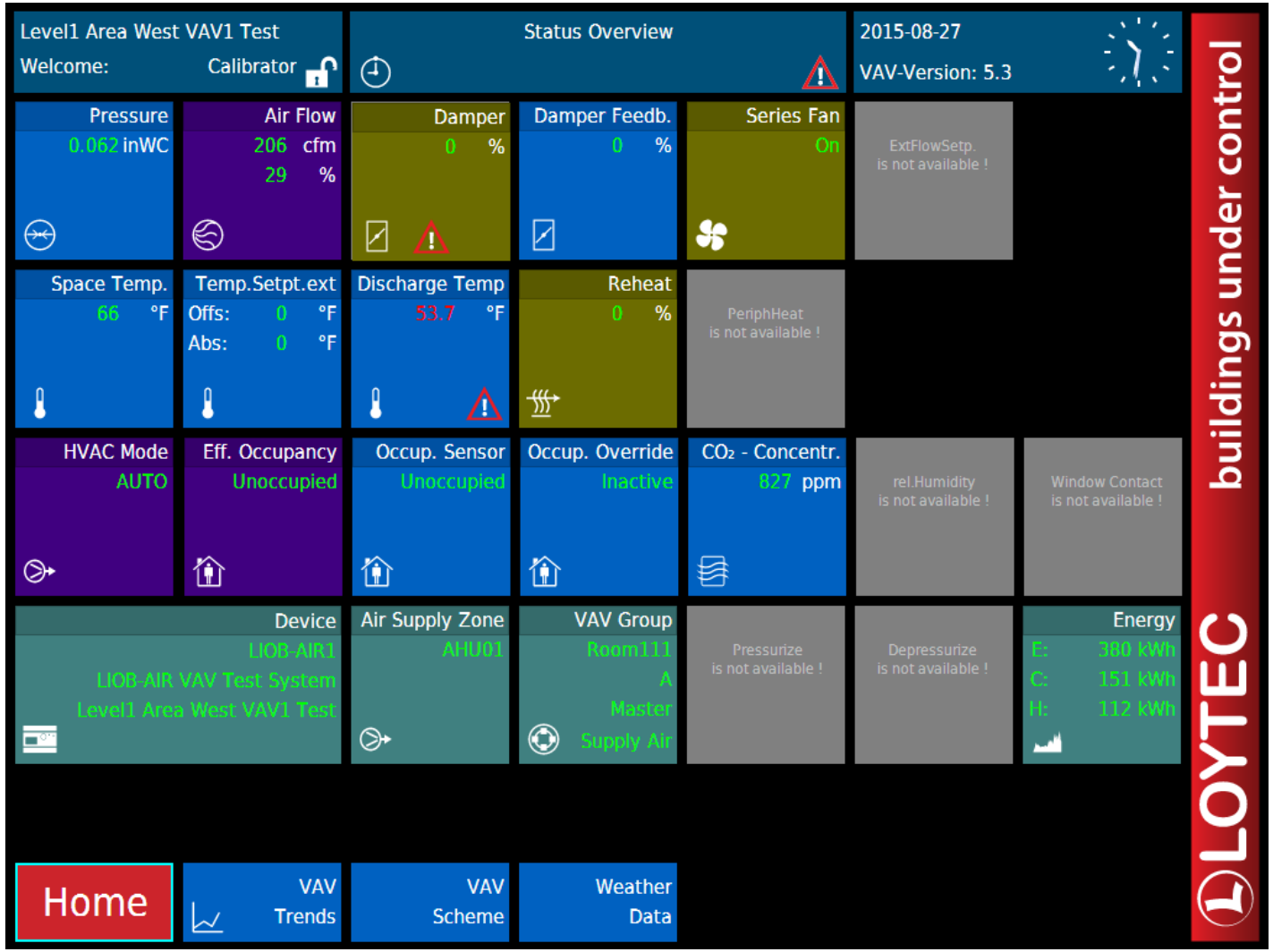
Użytkowanie codzienne

Narzędzie do kalibracji i konfiguracji



Total Building View

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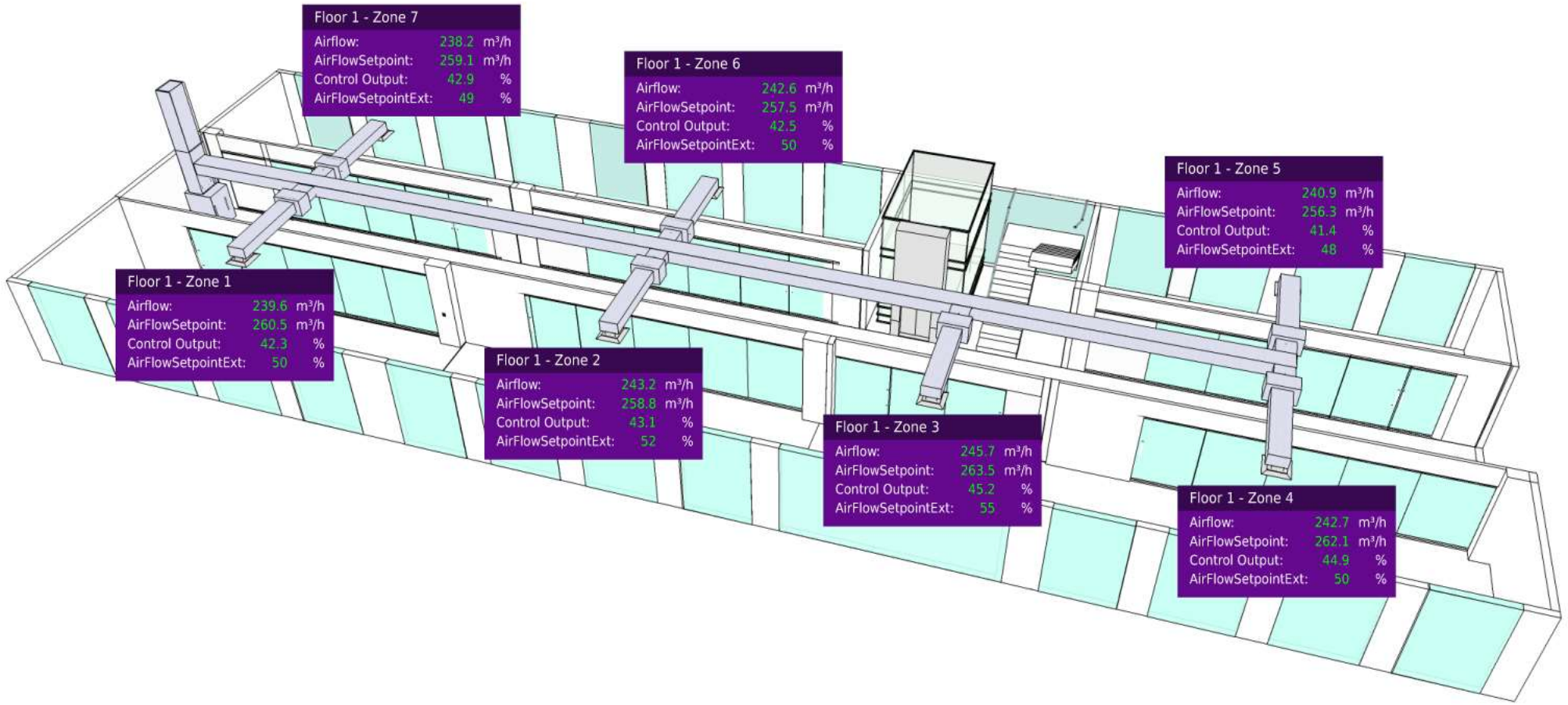
VAV O4 West Supply			VAV O4 West Exhaust			VAV O4 East Supply			VAV O4 East Exhaust		
AirFlow:	164.1	m³/h	AirFlow:	0.3	m³/h	AirFlow:	165.4	m³/h	AirFlow:	179.7	m³/h
AirFlowSetpoint:	156.3	m³/h	AirFlowSetpoint:	0.0	m³/h	AirFlowSetpoint:	171.3	m³/h	AirFlowSetpoint:	164.8	m³/h
Control Output:	6.7	%	Control Output:	0.0	%	Control Output:	19.4	%	Control Output:	26.1	%
AirFlowSetpointExt:	25	%	AirFlowSetpointExt:	0	%	AirFlowSetpointExt:	40	%			
Master	O4WestS		Master	O4WestE		Master	O4East		Slave	O4East	
VAV O3 West Supply			**VAV O3 West Exhaust**			**VAV O3 East Supply**			**VAV O3 East Exhaust**		
AirFlow:	242.6	m³/h	AirFlow:	251.3	m³/h	AirFlow:	273.6	m³/h	AirFlow:	257.6	m³/h
AirFlowSetpoint:	257.5	m³/h	AirFlowSetpoint:	236.7	m³/h	AirFlowSetpoint:	272.9	m³/h	AirFlowSetpoint:	273.6	m³/h
Control Output:	42.5	%	Control Output:	41.9	%	Control Output:	38.6	%	Control Output:	74.4	%
AirFlowSetpointExt:	50	%				AirFlowSetpointExt:	50	%			
Master	O3West		Slave	O3West		Master	O3East		Slave	O3East	
VAV O2 West Supply			**VAV O2 West Exhaust**			**VAV O2 East Supply**			**VAV O2 East Exhaust**		
AirFlow:	257.6	m³/h	AirFlow:	246.4	m³/h	AirFlow:	259.6	m³/h	AirFlow:	278.5	m³/h
AirFlowSetpoint:	258.6	m³/h	AirFlowSetpoint:	258.6	m³/h	AirFlowSetpoint:	272.9	m³/h	AirFlowSetpoint:	260.4	m³/h
Control Output:	35.8	%	Control Output:	41.7	%	Control Output:	42.2	%	Control Output:	52.8	%
AirFlowSetpointExt:	50	%				AirFlowSetpointExt:	50	%			
Master	O2West		Slave	O2West		Master	O2East		Slave	O2East	
VAV O1 West Supply			**VAV O1 West Exhaust**			**VAV O1 East Supply**			**VAV O1 East Exhaust**		
AirFlow:	503.4	m³/h	AirFlow:	493.4	m³/h	AirFlow:	483.1	m³/h	AirFlow:	488.6	m³/h
AirFlowSetpoint:	508.0	m³/h	AirFlowSetpoint:	507.5	m³/h	AirFlowSetpoint:	494.0	m³/h	AirFlowSetpoint:	486.5	m³/h
Control Output:	89.2	%	Control Output:	93.6	%	Control Output:	96.4	%	Control Output:	56.4	%
AirFlowSetpointExt:	100	%				AirFlowSetpointExt:	100	%			
Master	O1West		Slave	O1West		Master	O1East		Slave	O1East	
VAV E0 West Supply			**VAV E0 West Exhaust**			**VAV E0 East Supply**			**VAV E0 East Exhaust**		
AirFlow:	800.1	m³/h	AirFlow:	790.1	m³/h	AirFlow:	66.1	m³/h	AirFlow:	160.8	m³/h
AirFlowSetpoint:	789.0	m³/h	AirFlowSetpoint:	770.8	m³/h	AirFlowSetpoint:	0.0	m³/h	AirFlowSetpoint:	0.0	m³/h
Control Output:	40.6	%	Control Output:	45.6	%	Control Output:	0.0	%	Control Output:	0.0	%
AirFlowSetpointExt:	40	%				AirFlowSetpointExt:	0	%	AirFlowSetpointExt:	0	%
Master	E0Production		Slave	E0Production		Master	E0Foyer		Master ⚠	E0Foyer	

Floorplan View



Mass Engineering with Parameter Views

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	Group \ Parameter	idRoom	idSegment	DuctArea	DuctDiameter	MaxFlowCooling	MaxFlowHeating	MaxFlowUnitHeating	MinFlowCooling	MinFlowHeating	MinFlowUnitHeating	NominalFlowBox	PitotFactor
▶ 01	BG37_VAV_E0_East_Exhaust:Datapoints	E0Foyer	6022	0.03 m²	0.25 m	504 m³/h	504 m³/h	504 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
02	BG37_VAV_E0_East_Supply:Datapoints	E0Foyer	6021	0.03 m²	0.25 m	504 m³/h	504 m³/h	504 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
03	BG37_VAV_E0_West_Exhaust:Datapoints	E0Production	6012	0.0779 m²	0.25 m	2756 m³/h	2756 m³/h	2756 m³/h	300 m³/h	300 m³/h	300 m³/h	3680 m³/h	4.81 units
04	BG37_VAV_E0_West_Supply:Datapoints	E0Production	6011	0.0779 m²	0.25 m	2256 m³/h	2256 m³/h	2256 m³/h	300 m³/h	300 m³/h	300 m³/h	3680 m³/h	4.81 units
05	BG37_VAV_O1_East_Exhaust:Datapoints	O1East	6122	0.03 m²	0.25 m	494 m³/h	494 m³/h	494 m³/h	100 m³/h	100 m³/h	100 m³/h	1400 m³/h	2.215 units
06	BG37_VAV_O1_East_Supply:Datapoints	O1East	6121	0.03 m²	0.25 m	494 m³/h	494 m³/h	494 m³/h	100 m³/h	100 m³/h	100 m³/h	1400 m³/h	2.215 units
07	BG37_VAV_O1_West_Exhaust:Datapoints	O1West	6112	0.03 m²	0.25 m	508 m³/h	508 m³/h	508 m³/h	100 m³/h	100 m³/h	100 m³/h	1400 m³/h	2.215 units
08	BG37_VAV_O1_West_Supply:Datapoints	O1West	6111	0.03 m²	0.25 m	508 m³/h	508 m³/h	508 m³/h	100 m³/h	100 m³/h	100 m³/h	1400 m³/h	2.215 units
09	BG37_VAV_O2_East_Exhaust:Datapoints	O2East	6222	0.0201 m²	0.25 m	561 m³/h	561 m³/h	561 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
10	BG37_VAV_O2_East_Supply:Datapoints	O2East	6221	0.0201 m²	0.25 m	561 m³/h	561 m³/h	561 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
11	BG37_VAV_O2_West_Exhaust:Datapoints	O2West	6212	0.0201 m²	0.25 m	523 m³/h	523 m³/h	523 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
12	BG37_VAV_O2_West_Supply:Datapoints	O2West	6211	0.0201 m²	0.25 m	523 m³/h	523 m³/h	523 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
13	BG37_VAV_O3_East_Exhaust:Datapoints	O3East	6322	0.0201 m²	0.25 m	561 m³/h	561 m³/h	561 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
14	BG37_VAV_O3_East_Supply:Datapoints	O3East	6321	0.0201 m²	0.25 m	561 m³/h	561 m³/h	561 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
15	BG37_VAV_O3_West_Exhaust:Datapoints	O3West	6312	0.0201 m²	0.25 m	520 m³/h	520 m³/h	520 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
16	BG37_VAV_O3_West_Supply:Datapoints	O3West	6311	0.0201 m²	0.25 m	520 m³/h	520 m³/h	520 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
17	BG37_VAV_O4_East_Exhaust:Datapoints	O4East	6422	0.0201 m²	0.25 m	385 m³/h	385 m³/h	385 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
18	BG37_VAV_O4_East_Supply:Datapoints	O4East	6421	0.0201 m²	0.25 m	385 m³/h	385 m³/h	385 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
19	BG37_VAV_O4_West_Exhaust:Datapoints	O4West	6412	0.0201 m²	0.25 m	523 m³/h	523 m³/h	523 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
20	BG37_VAV_O4_West_Supply:Datapoints	O4West	6411	0.0779 m²	0.25 m	523 m³/h	523 m³/h	523 m³/h	100 m³/h	100 m³/h	100 m³/h	3680 m³/h	4.81 units
21	BG37_VAV_U1_West_Exhaust:Datapoints	U1Basement	6912	0.0779 m²	0.25 m	2228 m³/h	2228 m³/h	2228 m³/h	300 m³/h	300 m³/h	300 m³/h	3680 m³/h	4.81 units
22	BG37_VAV_U1_West_Supply:Datapoints	U1Basement	6911	0.0779 m²	0.25 m	2228 m³/h	2228 m³/h	2228 m³/h	300 m³/h	300 m³/h	300 m³/h	3680 m³/h	4.81 units

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Organizacja projektu

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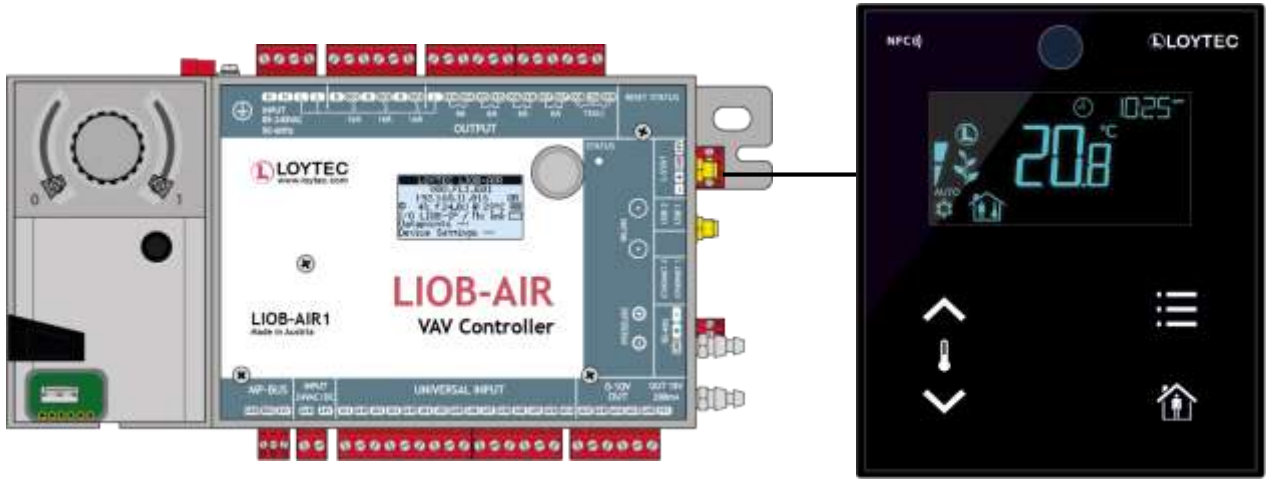
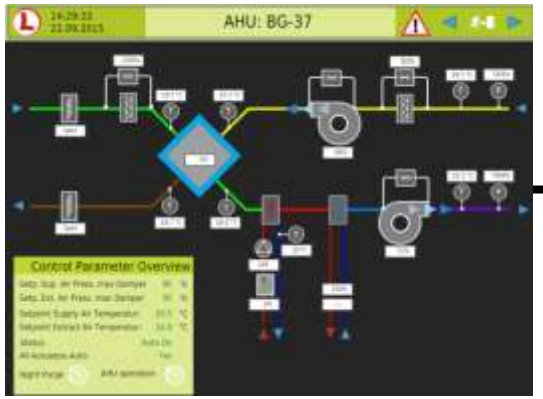
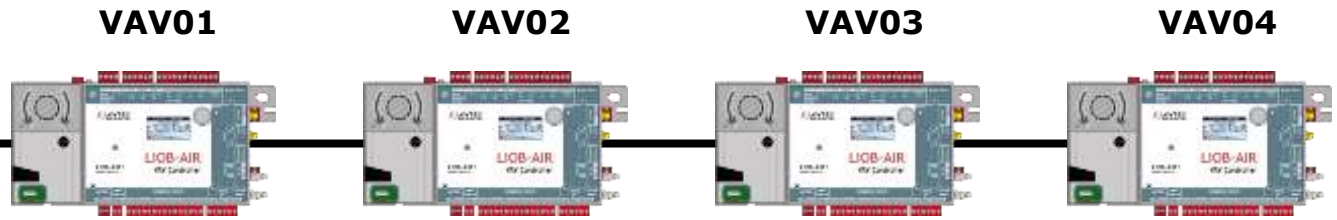
Scenariusz dla pojedynczego urządzenia

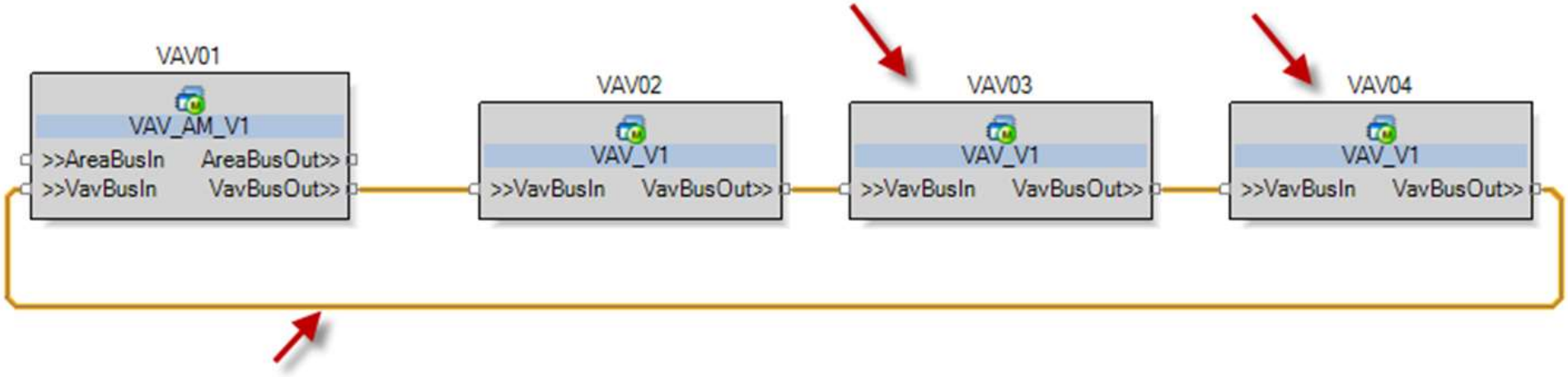


Scenariusz dla zestawu Centrala HVAC + zestaw VAV

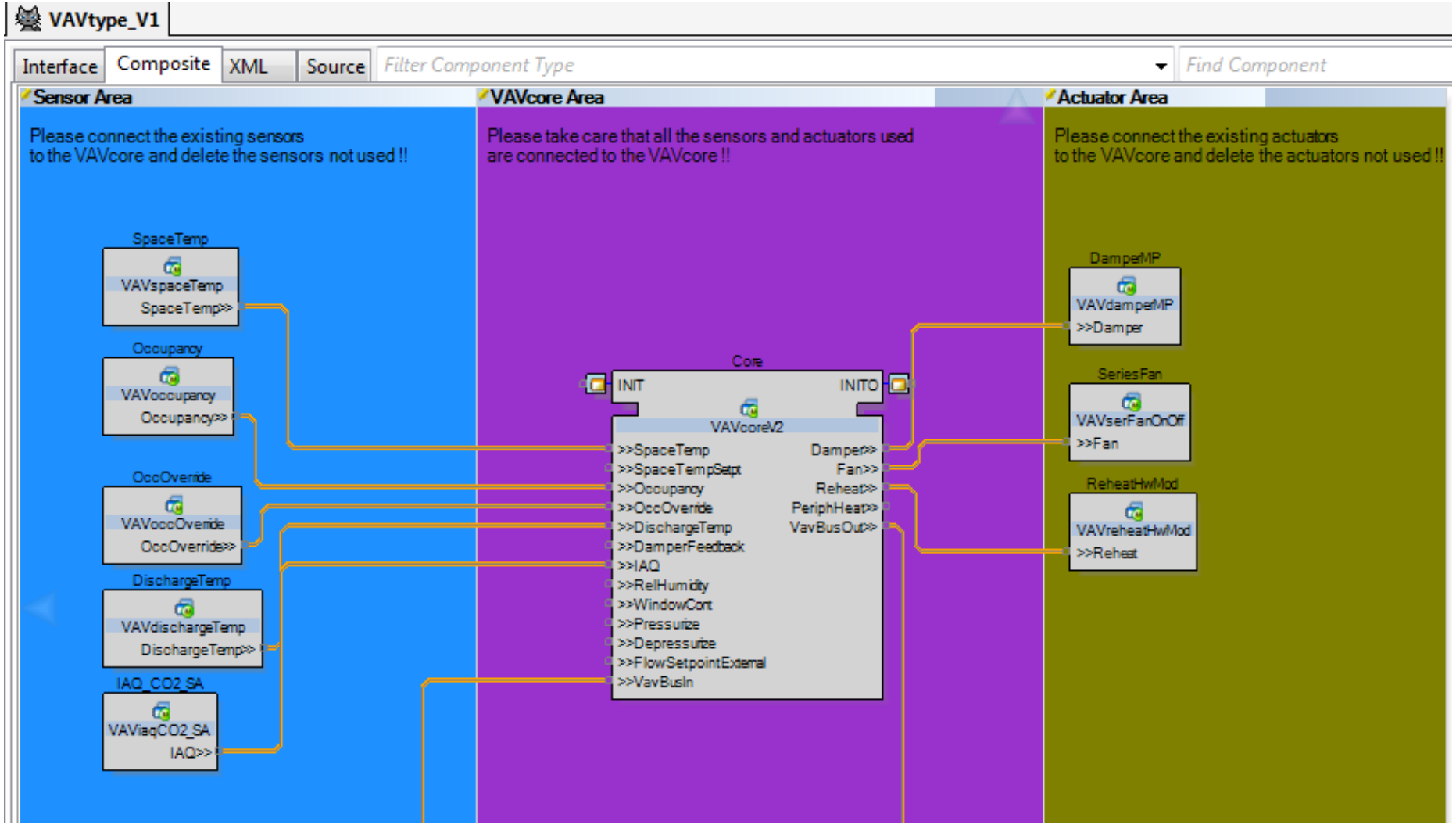




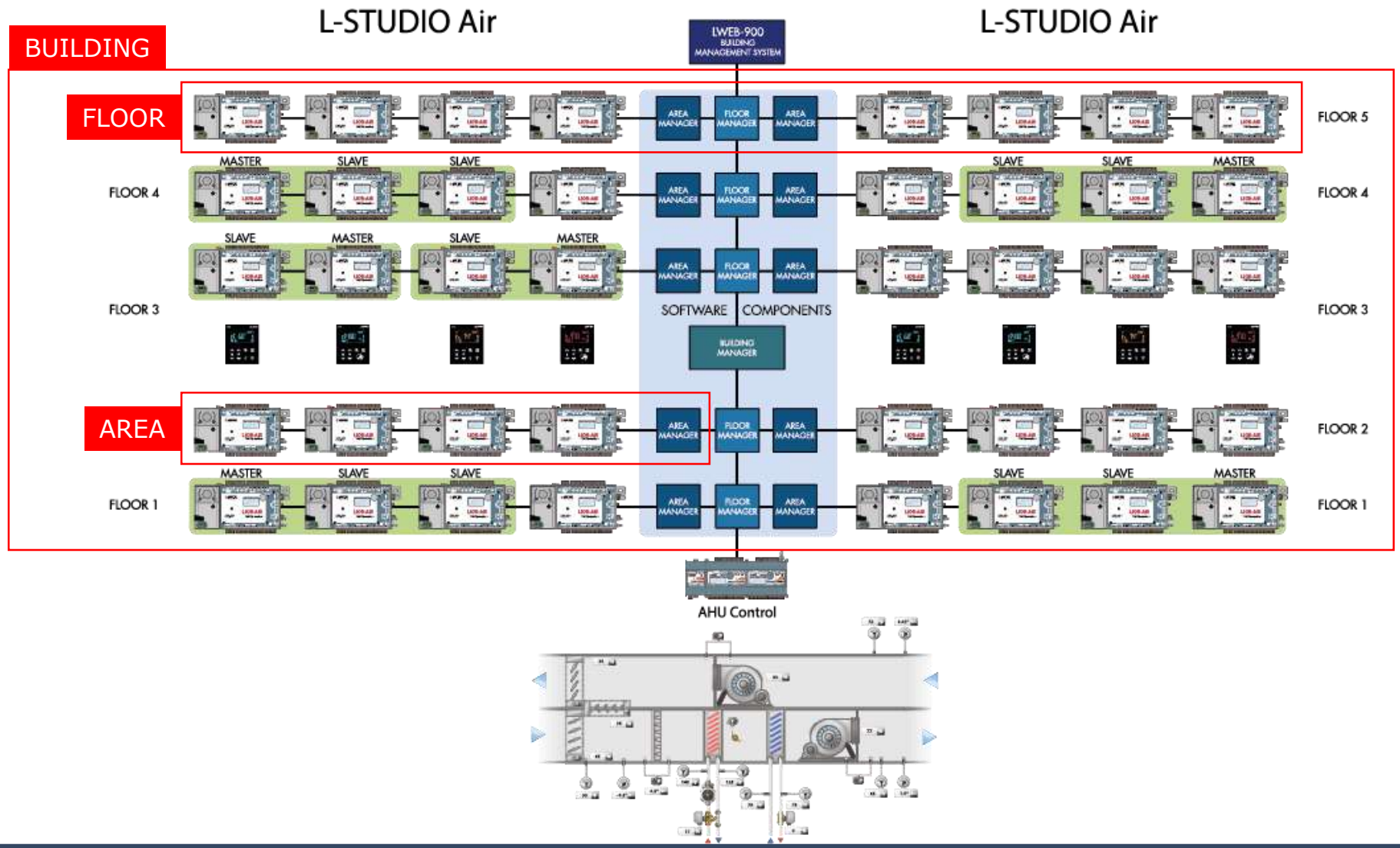
Area Manager



Konfiguracja VAV: czujniki & elementy wykonawcze



Scenariusz strukturalny



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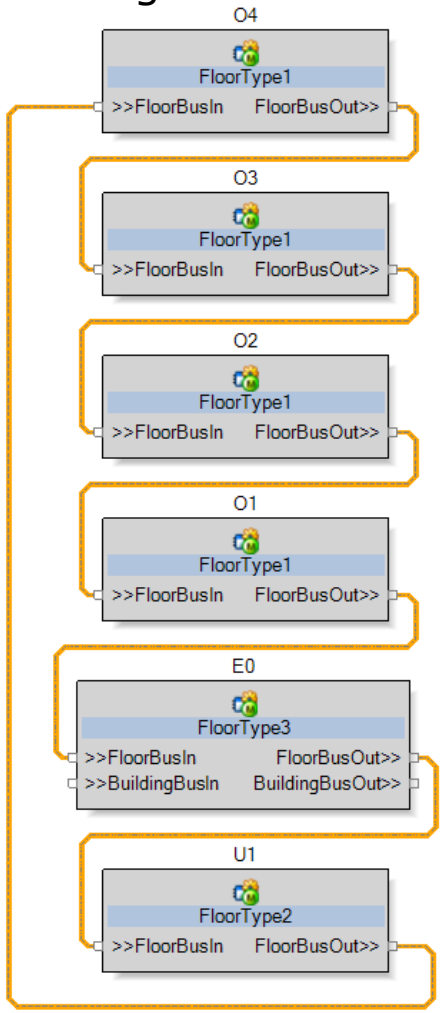
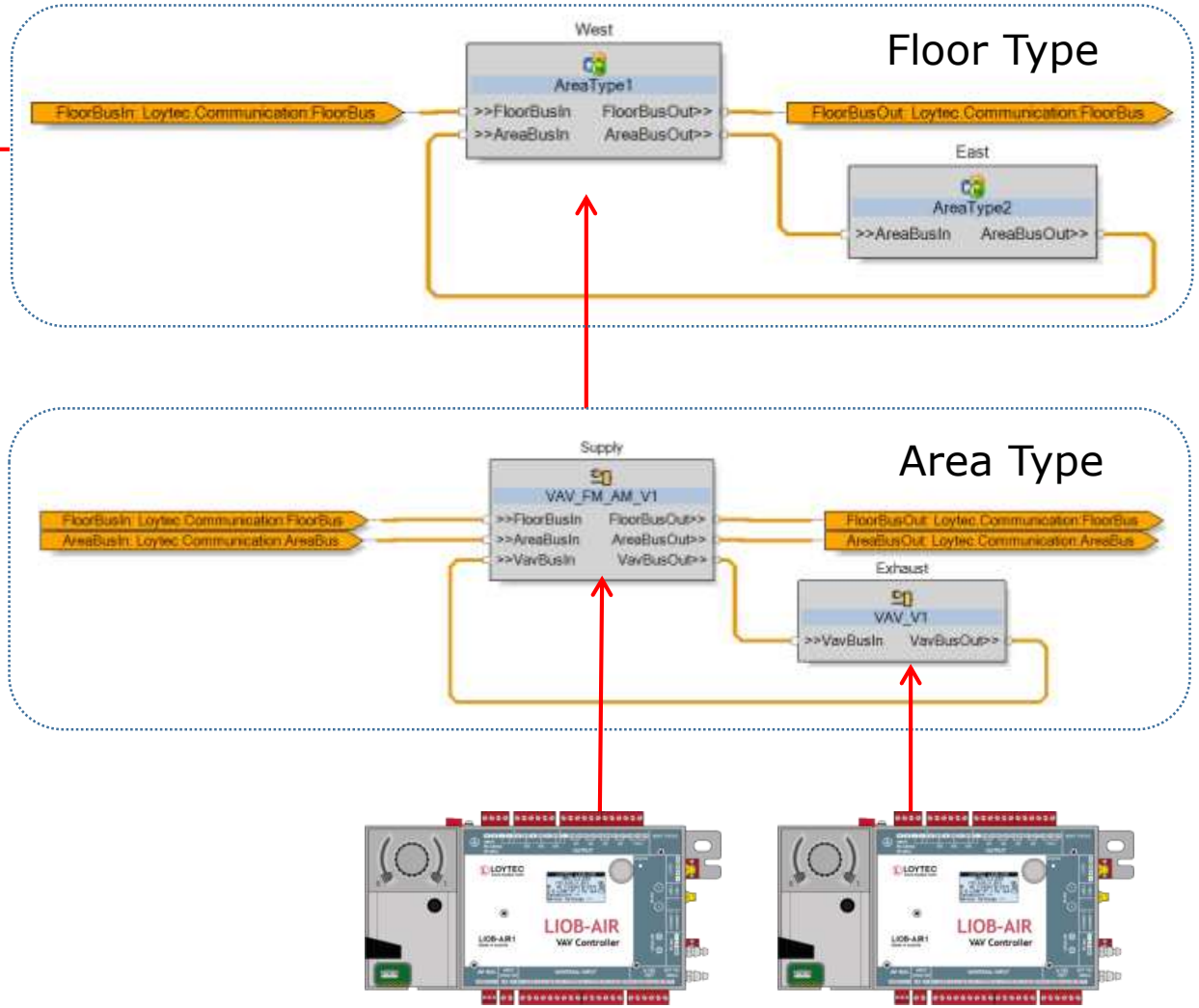
Building





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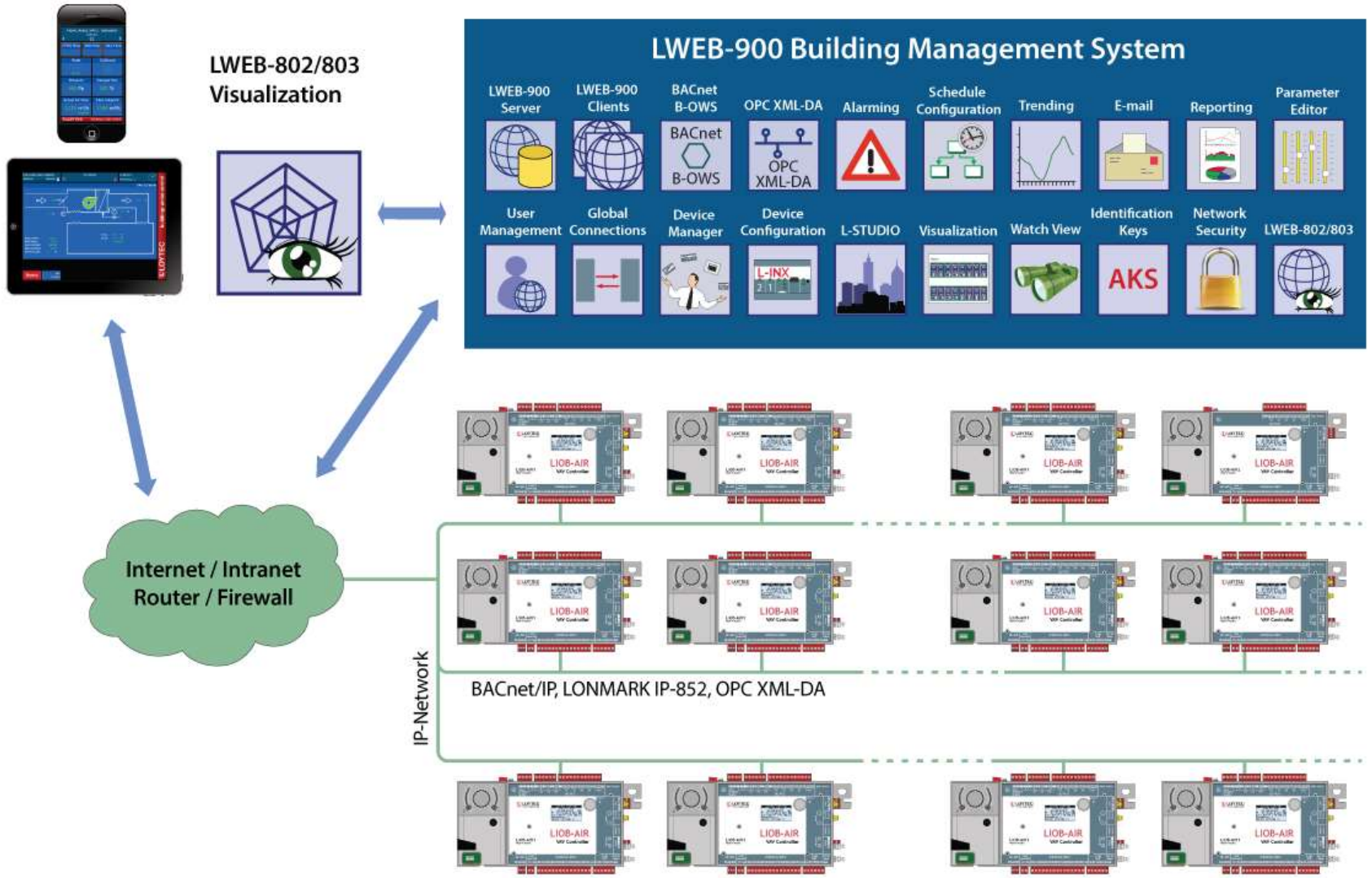
Building Management Integration

LWEB-900

LIOB-AIR System Architecture



Alarm Management

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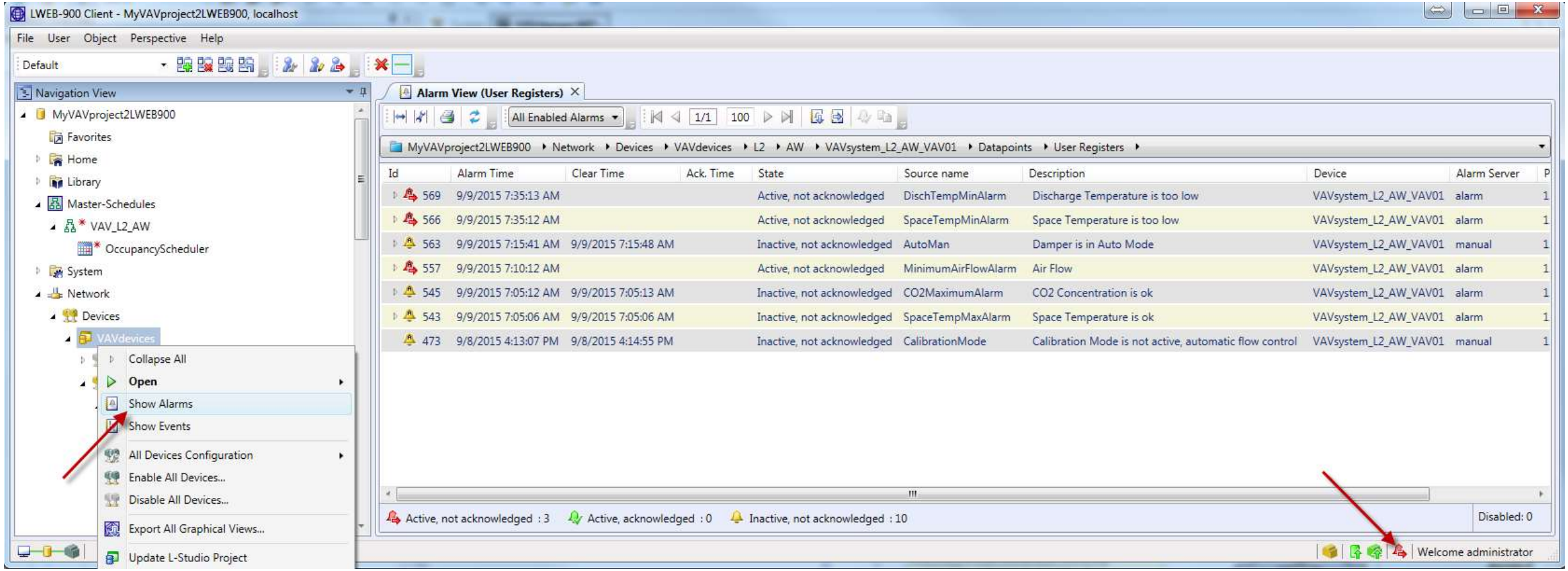
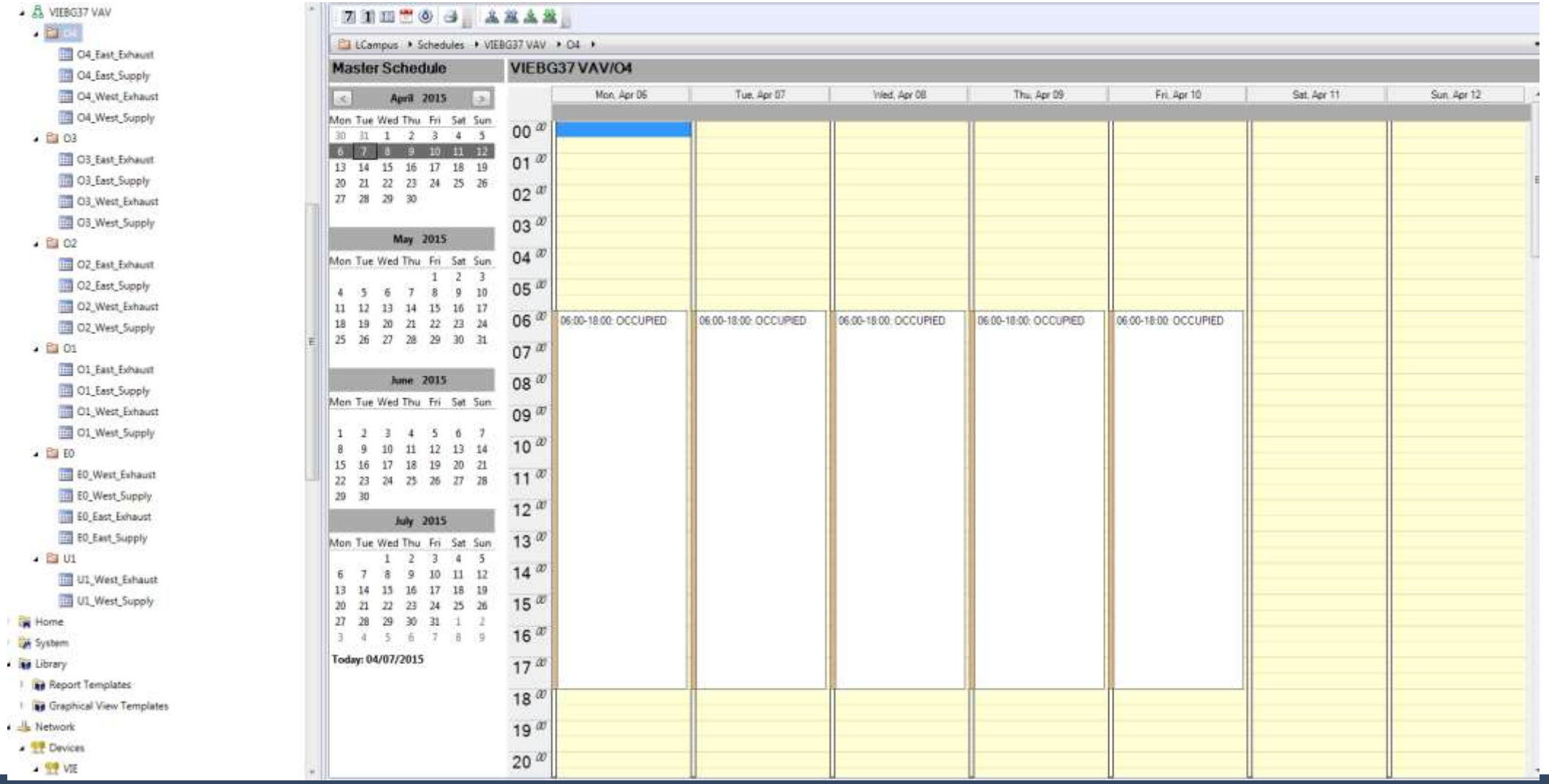


Time-of-Day Scheduling



Firmware Update, Backup/Restore, Device Replacement

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Device	IP address	Type	FW	LIOB FW	Configuration	Parameter file	Program file	L-Web project	Device status
BG37_VAV_E0_VAVbuilding	10.101.67.100:80	LROC-100	NEW	-	✓	✓	N/A	-	Ok
BG37_VAV_E0_West_Exhaust	10.101.67.102:80	LIOB-AIR1	↓	N/A	✓	✓	N/A	-	Ok
BG37_VAV_E0_West_Supply	10.101.67.101:80	LIOB-AIR1	↓	N/A	✓	✓	N/A	-	Ok
BG37_VAV_E0_East_Exhaust	10.101.67.104:80	LIOB-AIR1	↓	N/A	✓	✓	N/A	-	Ok
BG37_VAV_E0_East_Supply	10.101.67.103:80	LIOB-AIR1	↓	N/A	✓	✓	N/A	-	Ok
BG37_VAV_O1_East_Exhaust	10.101.67.114:80	LIOB-AIR1	↓	N/A	✓	✓	N/A	-	Ok
BG37_VAV_O1_East_Supply	10.101.67.113:80	LIOB-AIR1	↓	N/A	✓	✓	N/A	-	Ok
BG37_VAV_O1_West_Exhaust	10.101.67.112:80	LIOB-AIR1	↓	N/A	✓	✓	N/A	-	Ok
BG37_VAV_O1_West_Supply	10.101.67.111:80	LIOB-AIR1	↓	N/A	✓	✓	N/A	-	Ok
BG37_VAV_O2_East_Exhaust	10.101.67.124:80	LIOB-AIR1	↓	N/A	✓	✓	N/A	-	Ok
BG37_VAV_O2_East_Supply	10.101.67.123:80	LIOB-AIR1	↓	N/A	✓	✓	N/A	-	Ok
BG37_VAV_O2_West_Exhaust	10.101.67.122:80	LIOB-AIR1	↓	N/A	✓	✓	N/A	-	Ok
BG37_VAV_O2_West_Supply	10.101.67.121:80	LIOB-AIR1	↓	N/A	✓	✓	N/A	-	Ok
BG37_VAV_O3_East_Exhaust	10.101.67.134:80	LIOB-AIR1	↓	N/A	✓	✓	N/A	-	Ok
BG37_VAV_O3_East_Supply	10.101.67.133:80	LIOB-AIR1	↓	N/A	✓	✓	N/A	-	Ok
BG37_VAV_O3_West_Exhaust	10.101.67.132:80	LIOB-AIR1	↓	N/A	✓	✓	N/A	-	Ok
BG37_VAV_O3_West_Supply	10.101.67.131:80	LIOB-AIR1	↓	N/A	✓	✓	N/A	-	Ok
BG37_VAV_O4_East_Exhaust	10.101.67.144:80	LIOB-AIR1	↓	N/A	✓	✓	N/A	-	Ok
BG37_VAV_O4_East_Supply	10.101.67.143:80	LIOB-AIR1	↓	N/A	✓	✓	N/A	-	Ok
BG37_VAV_O4_West_Exhaust	10.101.67.142:80	LIOB-AIR1	↓	N/A	✓	✓	N/A	-	Ok
BG37_VAV_O4_West_Supply	10.101.67.141:80	LIOB-AIR1	↓	N/A	✓	✓	N/A	-	Ok
BG37_VAV_U1_West_Exhaust	10.101.67.12:80	LIOB-AIR1	↓	N/A	✓	✓	N/A	-	Ok
BG37_VAV_U1_West_Supply	10.101.67.11:80	LIOB-AIR1	↓	N/A	✓	✓	N/A	-	Ok

Firmware file	↓	Select new firmware file
Type		LIOB-AIR1
Latest version in database		5.2.0 - 2015-03-31 19:09:46
Version in database for this device		5.2.0 - 2015-03-31 19:09:46
Version on device		5.2.0 - 2015-03-23 08:03:42

Change Operating Parameters

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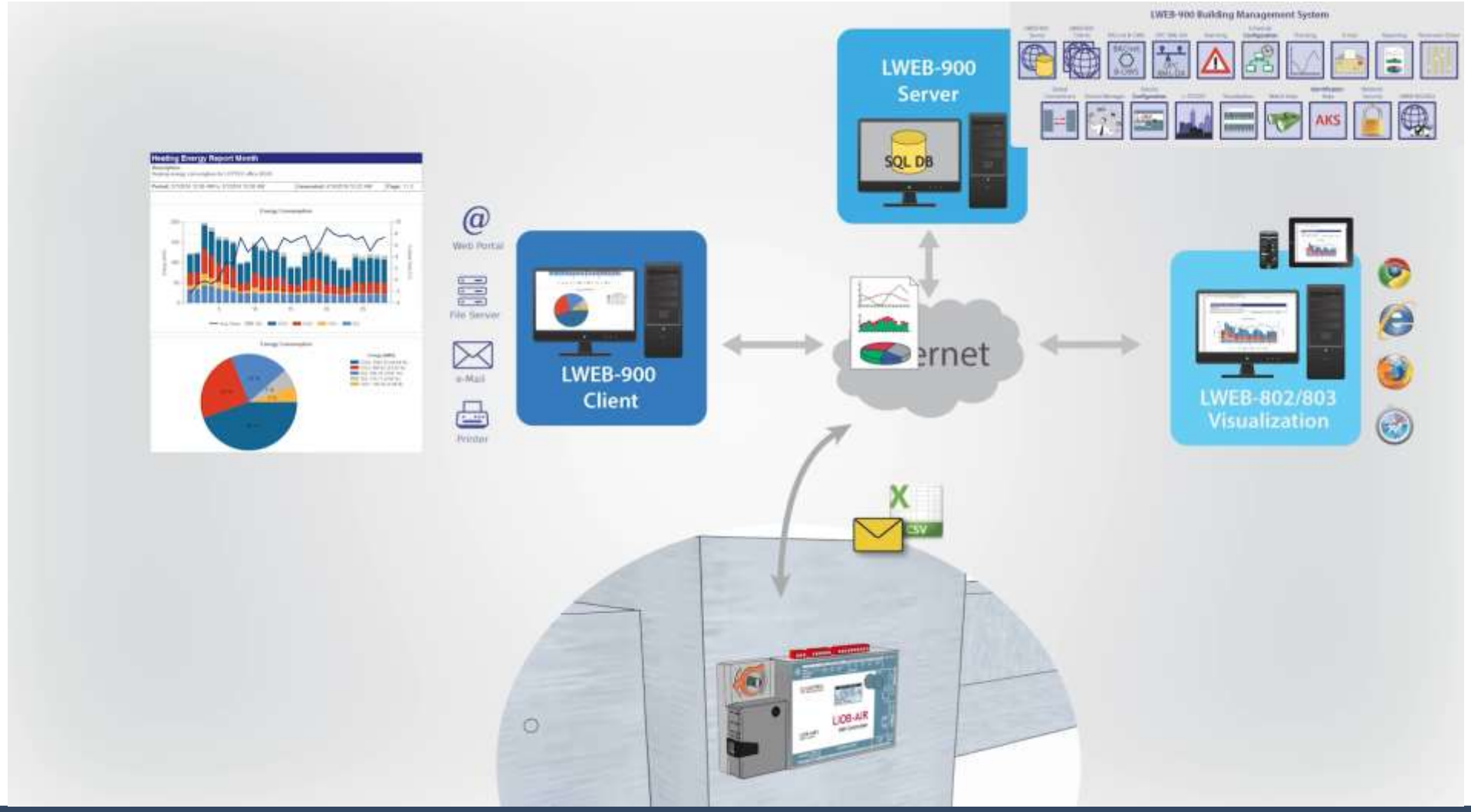
	Group \ Parameter	idRoom	idSegment	DuctArea	DuctDiameter	MaxFlowCooling	MaxFlowHeating	MaxFlowUnitHeating	MinFlowCooling	MinFlowHeating	MinFlowUnitHeating	NominalFlowBox	PitotFactor
▶ 01	BG37_VAV_E0_East_Exhaust:Datapoints	E0Foyer	6022	0.03 m²	0.25 m	504 m³/h	504 m³/h	504 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
02	BG37_VAV_E0_East_Supply:Datapoints	E0Foyer	6021	0.03 m²	0.25 m	504 m³/h	504 m³/h	504 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
03	BG37_VAV_E0_West_Exhaust:Datapoints	E0Production	6012	0.0779 m²	0.25 m	2756 m³/h	2756 m³/h	2756 m³/h	300 m³/h	300 m³/h	300 m³/h	3680 m³/h	4.81 units
04	BG37_VAV_E0_West_Supply:Datapoints	E0Production	6011	0.0779 m²	0.25 m	2256 m³/h	2256 m³/h	2256 m³/h	300 m³/h	300 m³/h	300 m³/h	3680 m³/h	4.81 units
05	BG37_VAV_O1_East_Exhaust:Datapoints	O1East	6122	0.03 m²	0.25 m	494 m³/h	494 m³/h	494 m³/h	100 m³/h	100 m³/h	100 m³/h	1400 m³/h	2.215 units
06	BG37_VAV_O1_East_Supply:Datapoints	O1East	6121	0.03 m²	0.25 m	494 m³/h	494 m³/h	494 m³/h	100 m³/h	100 m³/h	100 m³/h	1400 m³/h	2.215 units
07	BG37_VAV_O1_West_Exhaust:Datapoints	O1West	6112	0.03 m²	0.25 m	508 m³/h	508 m³/h	508 m³/h	100 m³/h	100 m³/h	100 m³/h	1400 m³/h	2.215 units
08	BG37_VAV_O1_West_Supply:Datapoints	O1West	6111	0.03 m²	0.25 m	508 m³/h	508 m³/h	508 m³/h	100 m³/h	100 m³/h	100 m³/h	1400 m³/h	2.215 units
09	BG37_VAV_O2_East_Exhaust:Datapoints	O2East	6222	0.0201 m²	0.25 m	561 m³/h	561 m³/h	561 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
10	BG37_VAV_O2_East_Supply:Datapoints	O2East	6221	0.0201 m²	0.25 m	561 m³/h	561 m³/h	561 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
11	BG37_VAV_O2_West_Exhaust:Datapoints	O2West	6212	0.0201 m²	0.25 m	523 m³/h	523 m³/h	523 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
12	BG37_VAV_O2_West_Supply:Datapoints	O2West	6211	0.0201 m²	0.25 m	523 m³/h	523 m³/h	523 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
13	BG37_VAV_O3_East_Exhaust:Datapoints	O3East	6322	0.0201 m²	0.25 m	561 m³/h	561 m³/h	561 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
14	BG37_VAV_O3_East_Supply:Datapoints	O3East	6321	0.0201 m²	0.25 m	561 m³/h	561 m³/h	561 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
15	BG37_VAV_O3_West_Exhaust:Datapoints	O3West	6312	0.0201 m²	0.25 m	520 m³/h	520 m³/h	520 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
16	BG37_VAV_O3_West_Supply:Datapoints	O3West	6311	0.0201 m²	0.25 m	520 m³/h	520 m³/h	520 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
17	BG37_VAV_O4_East_Exhaust:Datapoints	O4East	6422	0.0201 m²	0.25 m	385 m³/h	385 m³/h	385 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
18	BG37_VAV_O4_East_Supply:Datapoints	O4East	6421	0.0201 m²	0.25 m	385 m³/h	385 m³/h	385 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
19	BG37_VAV_O4_West_Exhaust:Datapoints	O4West	6412	0.0201 m²	0.25 m	523 m³/h	523 m³/h	523 m³/h	100 m³/h	100 m³/h	100 m³/h	900 m³/h	2.215 units
20	BG37_VAV_O4_West_Supply:Datapoints	O4West	6411	0.0779 m²	0.25 m	523 m³/h	523 m³/h	523 m³/h	100 m³/h	100 m³/h	100 m³/h	3680 m³/h	4.81 units
21	BG37_VAV_U1_West_Exhaust:Datapoints	U1Basement	6912	0.0779 m²	0.25 m	2228 m³/h	2228 m³/h	2228 m³/h	300 m³/h	300 m³/h	300 m³/h	3680 m³/h	4.81 units
22	BG37_VAV_U1_West_Supply:Datapoints	U1Basement	6911	0.0779 m²	0.25 m	2228 m³/h	2228 m³/h	2228 m³/h	300 m³/h	300 m³/h	300 m³/h	3680 m³/h	4.81 units

Automatic Reporting



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Prosta integracja ze sterownikami L-ROC Room Control

L-ROC

L-STUDIO może to zinterować !

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L-STUDIO

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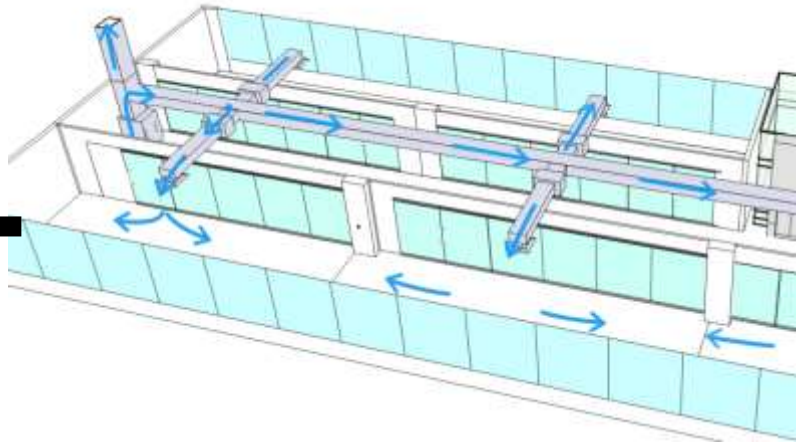

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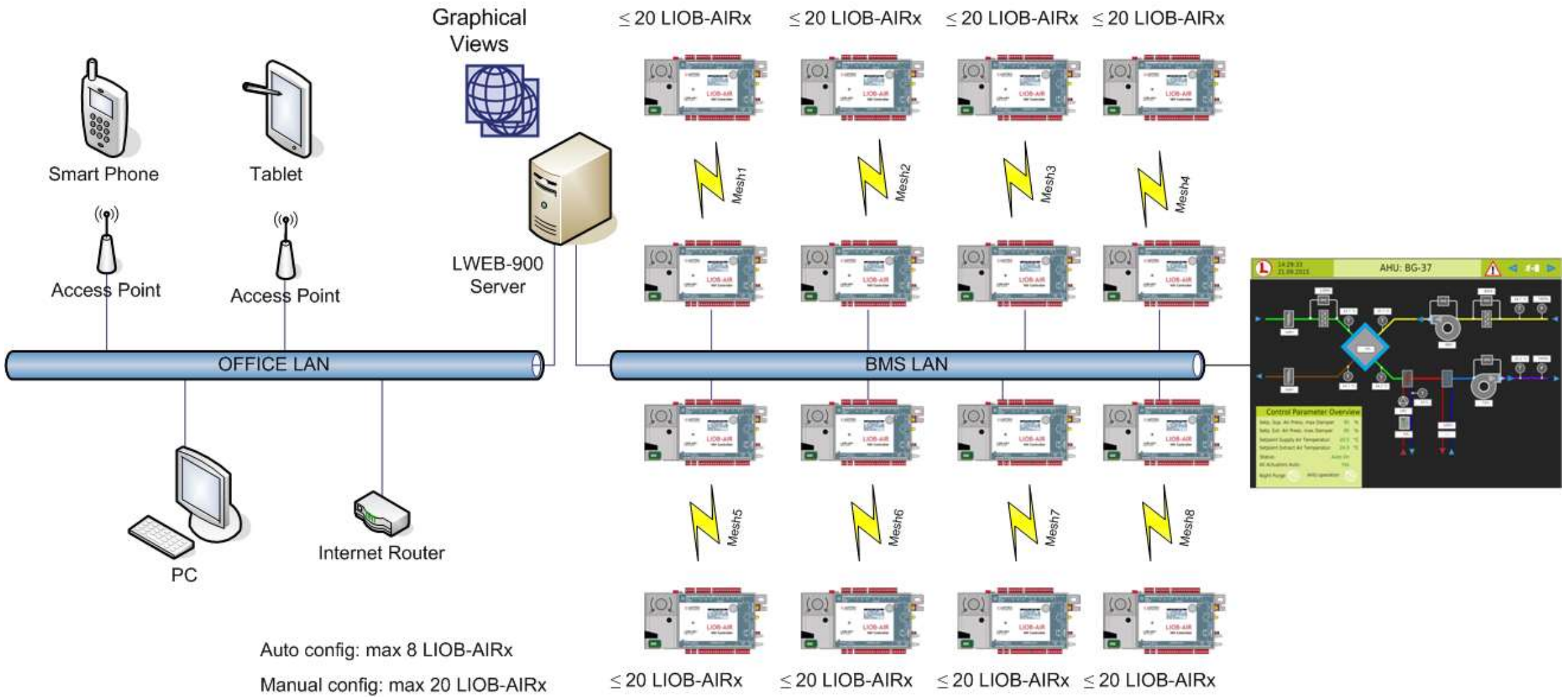
L-ROC Room Control

Ventilation

Duża instalacja sieci WLAN Mesh



Podsumowanie

Buildings under Control Symposium

- Bardzo szybka integracja systemu
- Projekt w pełni oparty na technologii IP
- Nie potrzeba żadnych dodatkowych elementów
- W pełni rozproszony system VAV
- Komunikacja przewodowa i bezprzewodowa
- System w pełni programowalny
- 24/7 wbudowane ciągłe testy on-line
- Zaawansowany algorytm DCV
- Integracja z BACnet & LON

Więcej Informacji

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