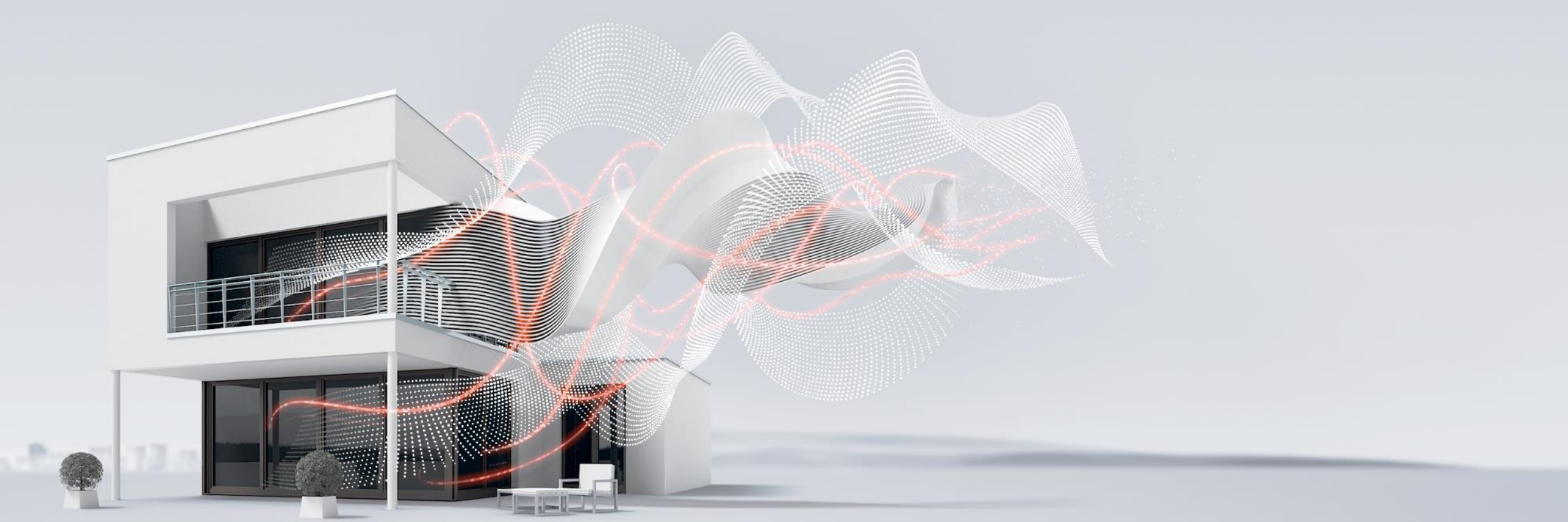


MAY 2020

Power consumption & distance calculation

ABB-Welcome M

Terminology

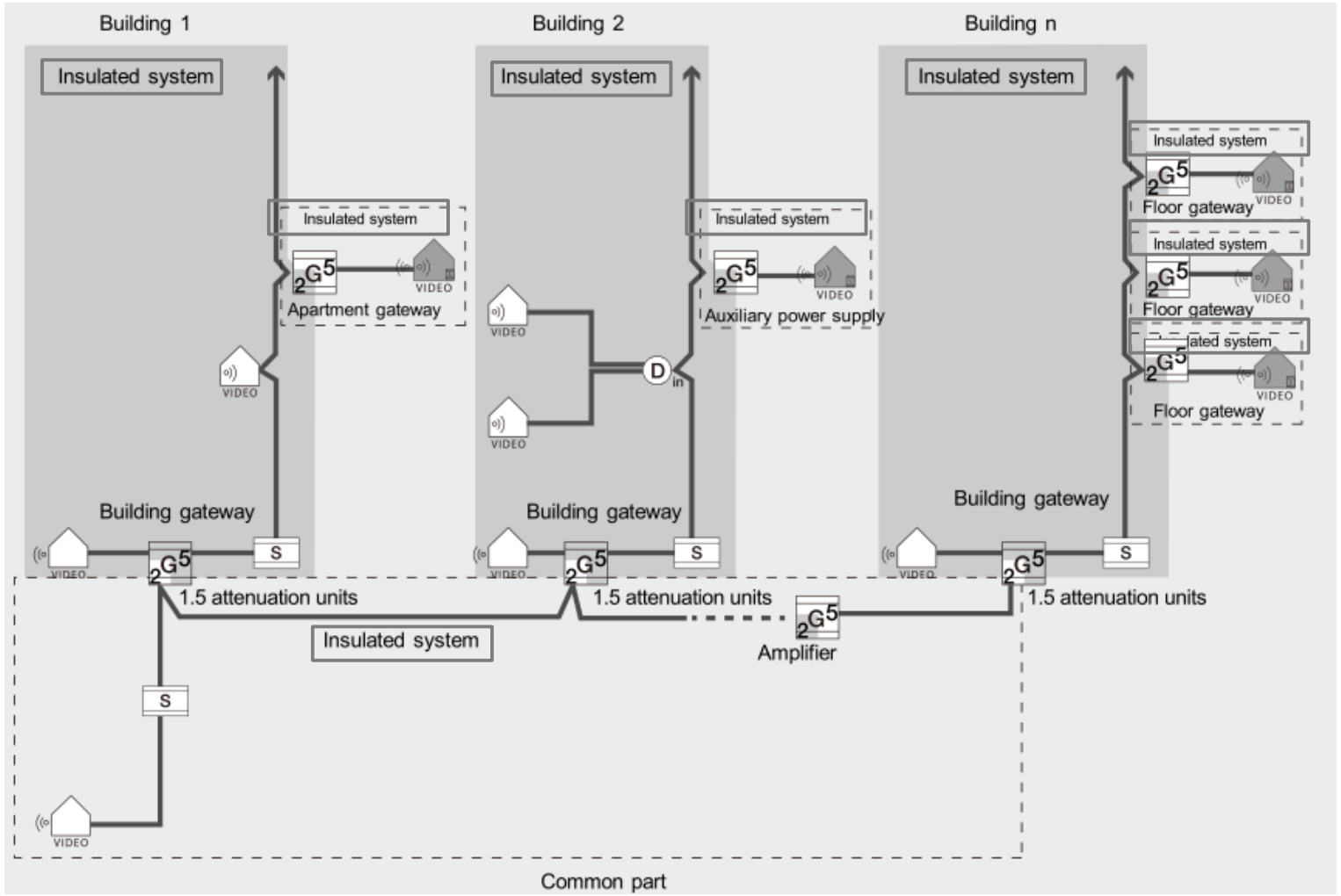
Insulated system

Insulated system refers to all the devices managed by one system controller. In the apartment system, floor system, building system or auxiliary power supply, each individual insulated system is linked through a gateway.

The operation within an insulated system will not interrupt the other insulated system. It is an important concept, both power consumption calculation and distance calculation are based on insulated system.

Terminology

Insulated system



9 insulated system are contained in the above example.

Terminology

External bus & internal bus

In the same insulated system, the system controller supplies the other bus subscribers with voltage and controls communication on the 2-wire bus. Starting from the system controller, the 2-wire bus is divided into 2 parts — the ***internal bus*** and ***external bus***.

External bus:

The external bus is the bus for controlling devices of outdoors of the same insulated system and outdoor related system devices. In the building trunk system, it refers to the bus line from system controller to outdoor station. In the networked trunk system, it refers to the bus line from system controller to the gate station.

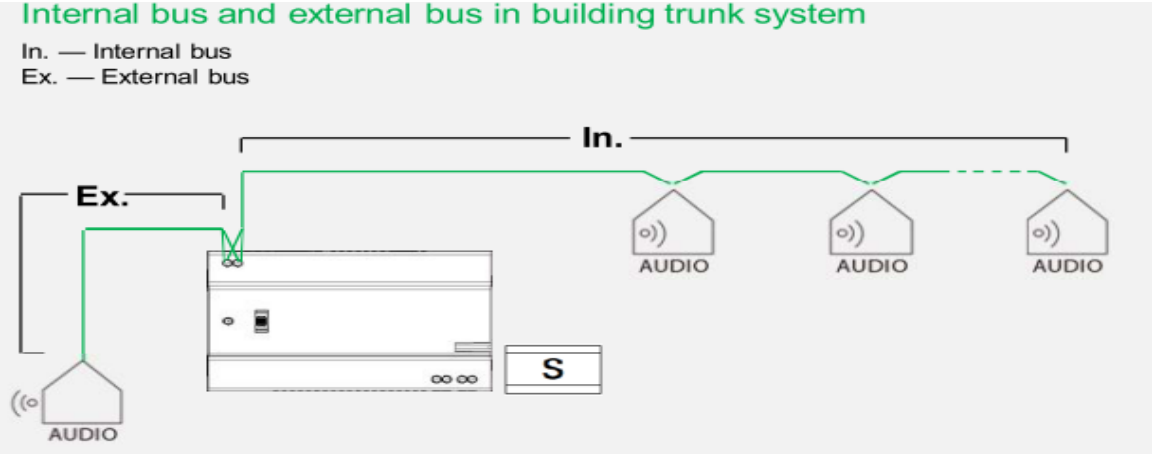
Internal bus:

The internal bus is the bus for controlling devices of indoors or sub insulated system devices. In the building trunk system, it refers to the bus line from system controller to the last indoor station. In the networked trunk system, it refers to the bus line from system controller to the last gateway.

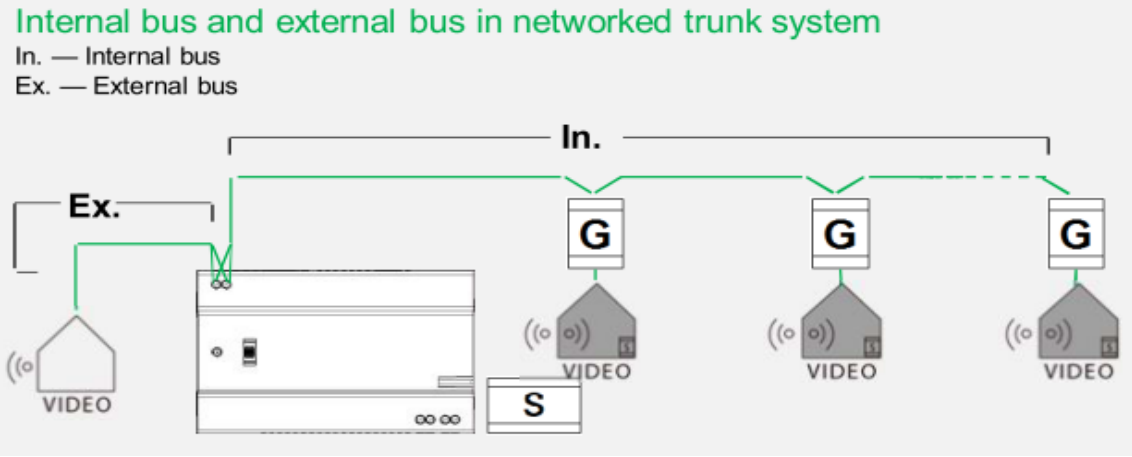
Terminology

External bus & internal bus

Internal bus and external bus in building trunk system



Internal bus and external bus in networked trunk system



Capacity

» For independent addressing, the devices' addresses are independent in the common part and in the building part.
» For combined addressing, the total address number of the devices in every building and the devices in common part should be less than a certain value.

	OS	IS	Gateway	GU	SA	CI	TG	IPGW	LCR
Total address: (independent addressing)	-	250	60(1) 99(2)	9	-	9(3)	99	250	16(5)
Total address: (combined addressing)	9	-		-	199	9(4)	-	-	-

(OS=outdoor station, IS=indoor station, GU=guard unit, SA=switch actuator
CI=camera interface, TG=telephone gateway, IPGW=IP-Gateway, LCR=lift control relay module)

(1) Supports up to 60 gateways in building gateway mode
(2) Supports up to 99 gateways in apartment gateway mode or floor gateway mode
(3) Supports up to 15 cameras - work associated with outdoor station/guard unit
Supports up to 36 cameras - work associated with indoor station
(4) Supports up to 36 cameras - work as independent outdoor station
(5) One M adaptor (M2306) can support 2 groups of relay modules (that means support 2 lifts).
Inside each lift, one M adaptor can support 16 relay modules. As each relay module has 16 relay outputs, it can support up to 256 floors (16 relay modules *16 relay outputs).

* Total address of independent addressing = Common part or every individual building part, two parts are independent
Total address of combine addressing = Common part + every individual building part, two parts are combined

Power consumption

System working rule

Indoor station

Apartment 1	Working
Apartment 2	Working/Standby
Apartment 3	Working/Standby
Apartment 4	Standby
Apartment 5	Standby
Apartment 6	Standby

Depends on working mode of system controller: **All on/One on**

Note:For total consumption calculation for apartments, we need to consider the worst case. Top 3 consumption !!!

Outdoor station

Outdoor station 1	Working + unlock(100mA)
Outdoor station 2	Standby + unlock(100mA)
Outdoor station 3	Standby
Outdoor station 4	Standby
Outdoor station 5	Standby
Outdoor station 6	Standby

…

Max.9 outdoor station

System device

Device 1	Working
Device 2	Working
Device 3	Working
Device 4	Working
Device 5	Working
Device 6	Working

…

Consumption of all devices should be less than system controller

Power consumption

All on -- Indoor station: 3 apartments work at the same time

1	Apartment 1	Working - **Incoming call**	**Device 1 (Calling) + Device 2 - n (Calling)**	All on - all devices in the apartment enter in calling mode and switch on screen to show the picture
2	Apartment 2	Working - **Setting**	**Device 1 (Setting) +** Device 2 – n (Standby)	Only 1 device in the apartment can be set
3	Apartment 3	Working - **Door bell**	**Device 1 (Door bell ring) + Device 2 - n (Door bell ring)**	All devices in the same apartment can ring
4	Apartment 4	Standby	Device 1 (Standby)+Device 2 (Standby) + ……	
5	Apartment 5	Standby	Device 1 (Standby)+Device 2 (Standby) + ……	
6	Apartment 6	Standby	Device 1 (Standby)+Device 2 (Standby) + ……	
7	Apartment 7	Standby	Device 1 (Standby)+Device 2 (Standby) + ……	
…	…	….	…	

Power consumption

One on -- Indoor station: 3 apartments work at the same time

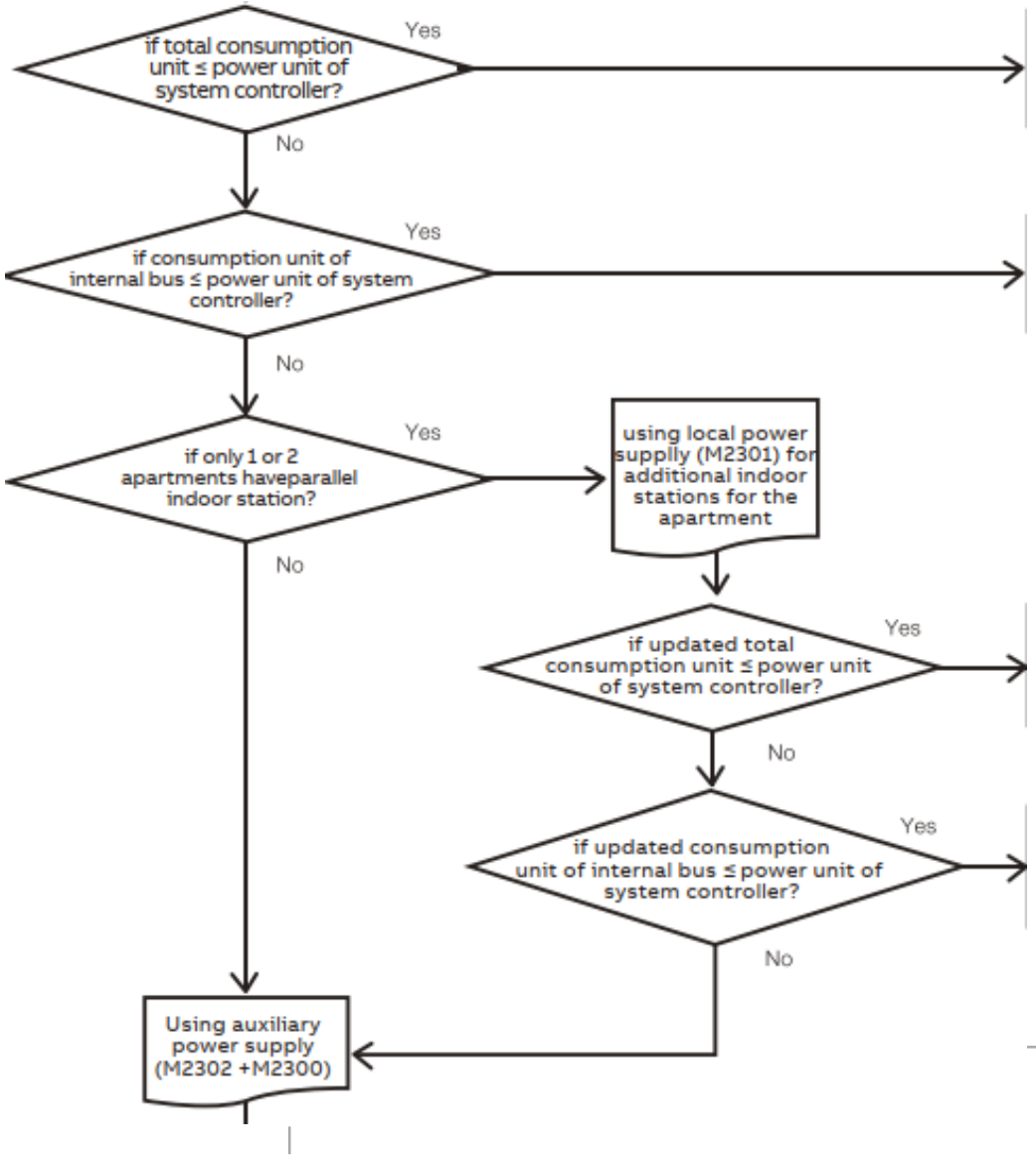
1	Apartment 1	Working - **Incoming call**	**Device 1 (Calling) + device 2 – n (Door bell ring)**	One on - all devices in the apartment enter in calling mode, but only one device switches on screen to show the picture
2	Apartment 2	Working - **Setting**	**Device 1 (Setting) +** Device 2 – n (Standby)	Only 1 device in the apartment can be set
3	Apartment 3	Working - **Door bell**	**Device 1 (Door bell ring) + Device 2 - n (Door bell ring)**	All devices in the same apartment can ring
4	Apartment 4	Standby	Device 1 (Standby)+Device 2 (Standby) + ……	
5	Apartment 5	Standby	Device 1 (Standby)+Device 2 (Standby) + ……	
6	Apartment 6	Standby	Device 1 (Standby)+Device 2 (Standby) + ……	
7	Apartment 7	Standby	Device 1 (Standby)+Device 2 (Standby) + ……	
…	…	….	…	

Power consumption

One on ***(New-for 4.3 WiFi indoor station only)*** -- Indoor station: only 1 apartment works

1	Apartment 1	Working - **Incoming call/Setting /Door bell**	**Device 1 (Calling) + Device 2 - n (Calling/Setting)**	One on - only the devices in 1 apartment can enter working mode, but only one device switches on screen to show the picture. other apartments are in standby mode
2	Apartment 2	**Standby**	Device 1 (Standby)+Device 2 (Standby) + ……	
3	Apartment 3	**Standby**	Device 1 (Standby)+Device 2 (Standby) + ……	
4	Apartment 4	Standby	Device 1 (Standby)+Device 2 (Standby) + ……	
5	Apartment 5	Standby	Device 1 (Standby)+Device 2 (Standby) + ……	
6	Apartment 6	Standby	Device 1 (Standby)+Device 2 (Standby) + ……	
7	Apartment 7	Standby	Device 1 (Standby)+Device 2 (Standby) + ……	
…	…	….	…	

How to calculate Power consumption?



Solution: 1 system controller

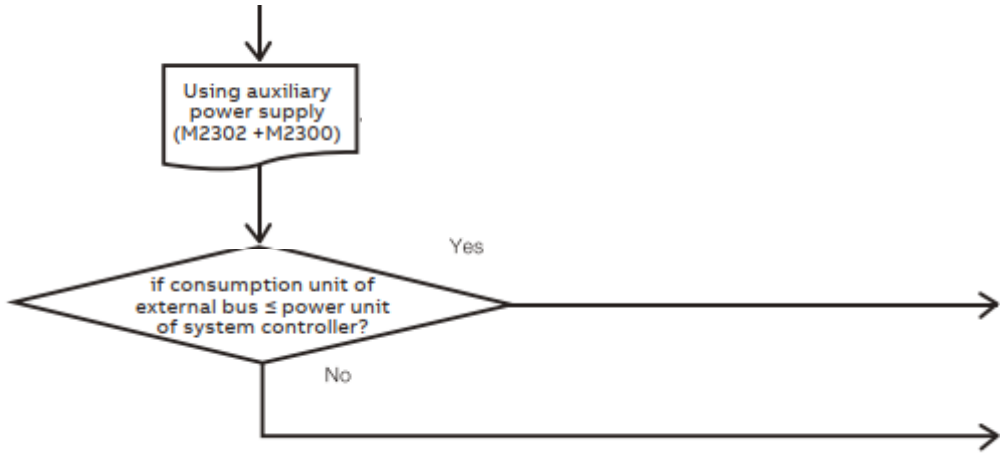
Solution:
Internal bus: 1 system controller
External bus: local power supply for OS

Solution:
1 system controller, and additional PS for ½ apartment

Solution:
Internal bus: 1 system controller, and additional PS for ½ apartment
External bus: local power supply for OS

Tips:
If system controller can't afford all devices, separate outdoor station, to check if system controller can afford internal bus only. If yes, using system controller to afford internal bus, and for external bus, local power supply is a better solution

How to calculate Power consumption?

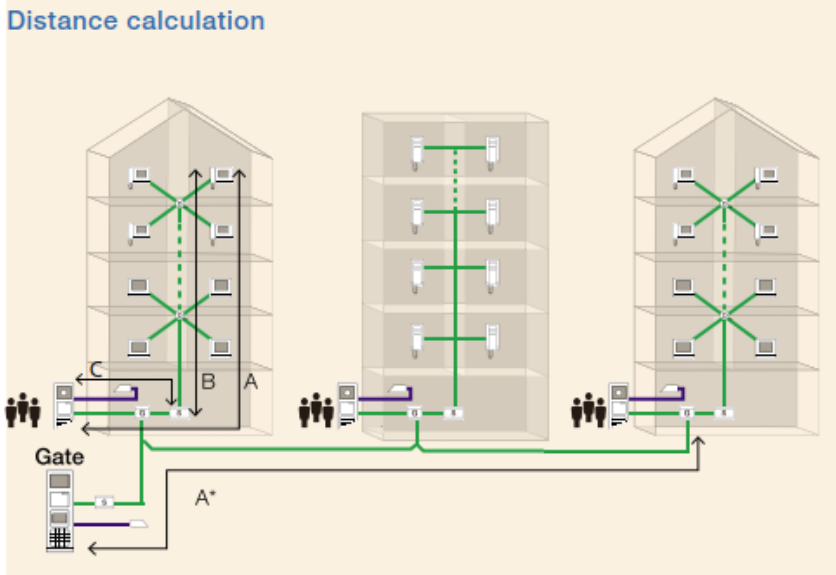


Solution:
External bus: 1 system controller
Internal bus: auxiliary power supply solution (system controller + gateway)

Solution:
Internal bus: auxiliary power supply solution (system controller + gateway)
External bus: local power supply for OS or auxiliary power solution for OS

Calculation of distance B&C

by power consumption



B: The distance from system controller to the furthest indoor station, calculation is based on total power unit of **internal bus**

C: The distance from system controller to the outdoor station, calculation is based on total power unit of **external bus**

For system controller to last device, it allows **6V** voltage loss for cable.

Cable length B = **6V** / (total consumption of **internal** bus) / cable resistance @100m *100
Cable length C = **6V** / (total consumption of **external** bus) / cable resistance @100m *100

** If in one insulated system, one device has local power supply, that means it doesn't need to be included in total consumption unit calculation

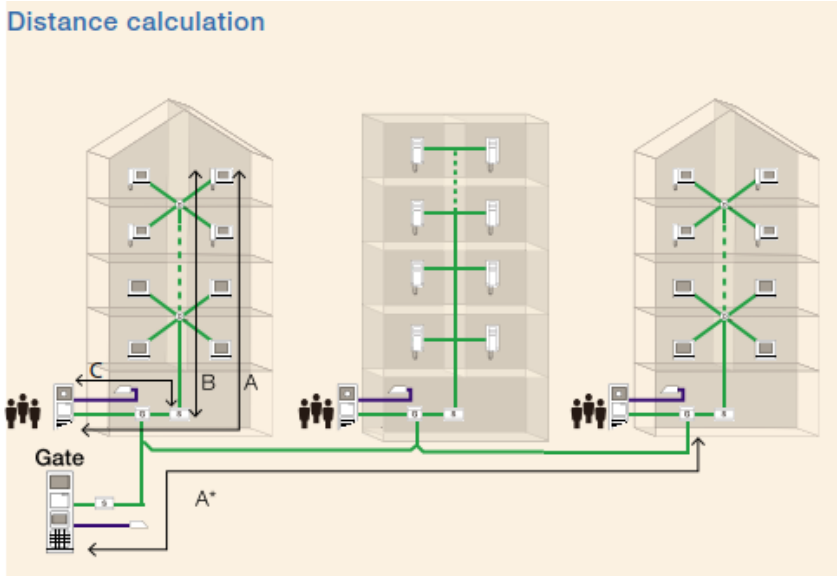
Calculation of distance B&C

by power consumption

Cable	 Coax, 75-5 Ø=0.75 mm, 0.45 mm²	 RVV, Ø=1 mm, 2 x 0.75 mm²	 J-Y(ST)-Y, Ø=0.8 mm, 2 x 0.5 mm²	 J-Y(ST)-Y, Ø=0.6 mm, 2 x 0.28 mm²	 UTP 5, 2 x Two pairs, each core Ø=0.5 mm 8 x 0.2 mm²
Cable resistance@100m (Ω)	4.6	4.88	7.32	13	4.68

Calculation of distance A & A*

By attenuation unit



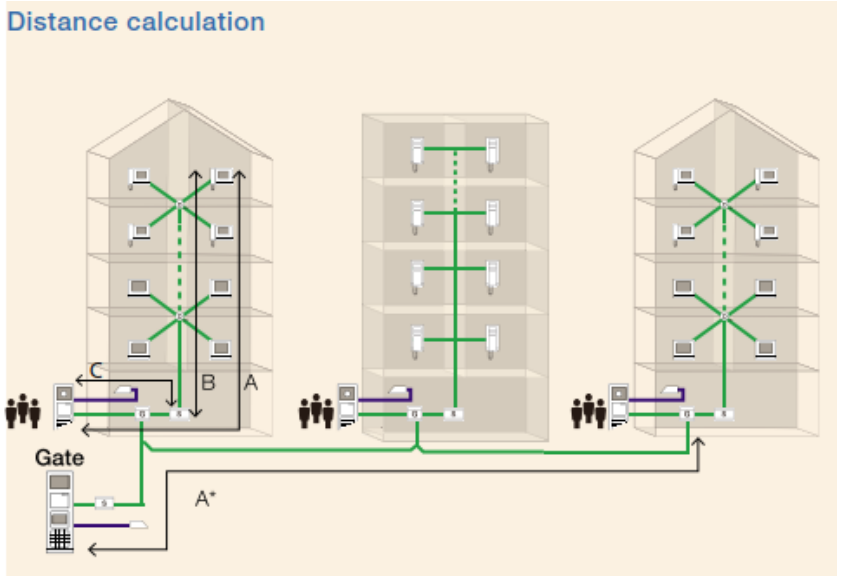
A: The distance from outdoor station to the furthest indoor station

(look up “**Table 2-2**”, basing on attenuation unit in this insulated system)

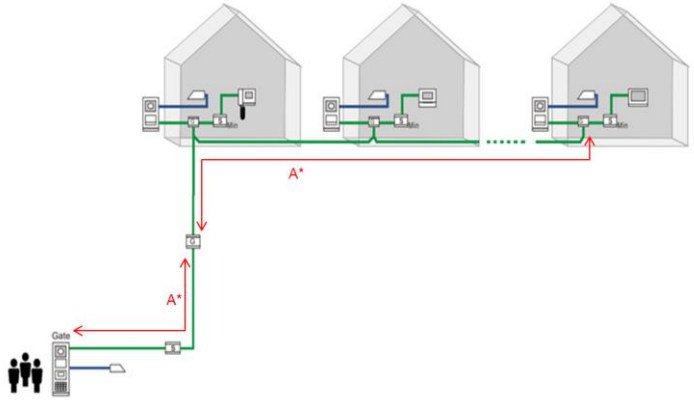
A*:The distance from outdoor station to the furthest gateway

(look up “**Table 2-3**”, basing on attenuation unit in this insulated system)

Rule of distance



- Length B + C <= Length A
- “Gateway” is one amplifier to extend the distance
  - If Gateway works in auxiliary power supply/ building gateway / floor gateway / apartment gateway mode , additional insulated system is added, so distance should be calculated additionally.
  - If gateway works in “line amplifier” mode, no more insulated system, but we also need to consider another length A* , as with this amplifier gateway, video signal is strengthened.



- In one insulated system, total length of all cables <=800m

Power consumption summary

External bus-Outdoor station

External bus-Outdoor station	Working current(mA)	Standby current(mA)	Attenuation unit
Camera module	110 or 0*	50 or 0*	-
Audio module	55 or 0*	18 or 0*	-
Audio/video module	120 or 0*	60 or 0*	-
Audio/video module, with T-loop	150 or 0*	60 or 0*	-
Audio module (Thin version)	40	8	-
Pushbutton module (3-row or 4-row)	8 or 0*	8 or 0*	-
Round pushbutton module	10 or 0*	10 or 0*	-
Round pushbutton module with NFC/IC	40 or 0*	40 or 0*	-
Keypad module	20 or 0*	20 or 0*	-
Display module (ID or IC)	160 or 0*	160 or 0*	-
Nameplate module / info module	8 or 0*	8 or 0*	-
Fingerprint module	40 or 0*	40 or 0*	-
Audio integration unit	50	12	-
Extension unit	10	10	-
Camera integration unit	160	40	-
Mini outdoor station	135	60	-

* When the device is powered by local power supply, the consumer got from system controller =0.

Power consumption summary

External bus-Outdoor station

External bus-Access control device	Working current(mA)	Standby current(mA)	Attenuation unit
Standalone keypad module	25	25	-
Standalone transponder module	30	15	-
Standalone fingerprint module	60	60	-

* When the device is powered by local power supply, the consumer got from system controller =0.

Power consumption summary

External bus-System device

External bus-System device	Working current(mA)	Attenuation unit
Outdoor distributor	0	15
Gateway	45	-
Gateway (line amplifier mode)	45	-
Guard unit	150 or 0*	1
Camera interface	70	1.5
Switch actuator	50	1

* When the device is powered by local power supply, the consumer got from system controller =0.

Power consumption summary

Internal bus-Indoor station

Internal bus-Indoor station	Working current(mA) (Incoming call)	Working current(mA) (setting)	Working current(mA) (Door bell ring)	Standby current(mA)	Attenuation unit
Audio handset Audio handset, with T-loop	70	70	70	8	1
Audio handsfree	60	60	60	8	1
4.3 Video handset 4.3 video handsfree Basic 4.3 video handsfree	150	150	50	8	1
4.3 Video handset, with T-loop 4.3 video handsfree, with T-loop Basic 4.3 video handsfree, with T-loop	200	200	50	8	1
7 Video handsfree	300	195	80	15	1
4.3 Video handsfree, WiFi	330	250	140	55	1
Free@home Touch 7	290	290	290	220	1
Smart Touch 7	400	400	400	125	1

* When the device is powered by local power supply, the consumer got from system controller =0.

Power consumption summary

Internal bus-System device

Internal bus-System device	Working current(mA)	Attenuation unit
Video distributor	8	2
Gateway	16	1.5
Gateway (line amplifier mode)	45	-
Guard unit	150 or 0*	1
Camera interface	70	1.5
Switch actuator	50	1
Telephone gateway	35	1
IP-Gateway	150	1
M adaptor (two functions: PC adaptor and lift control module)	16	1
2-wire adaptor	150	1

* When the device is powered by local power supply, the consumer got from system controller =0.

Power consumption summary

Total consumption

Internal bus-System device	Total current(mA)
System controller	1200
Mini system controller	650