

CABLE SIZE AND INSTALLATION GUIDE



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CABLE GUIDE INTRODUCTION

The information in this guide is intended to help ensure that the correct type of cable is selected and used when installing a VIDEX intercom system whether it is an audio intercom system, video intercom system and/or an access control system.

This guide should be read carefully before selecting and installing cables. Any damage caused to the equipment due to incorrect cabling where the information in this guide has not been followed is not the responsibility of Videx Security Ltd. and therefore cannot be held responsible for the installation of insufficient or inferior cable.

It is also recommended that any cable is installed by a competent and qualified electrician and/or security installation engineer.

VIDEX run free training courses for engineers who are unfamiliar or who have not installed VIDEX systems before. Technical help is also available on 0191 224 3174 during office hours (8:30am - 5:00pm MON to FRI) or by emailing Videx Technical on tech@videx-security.com.

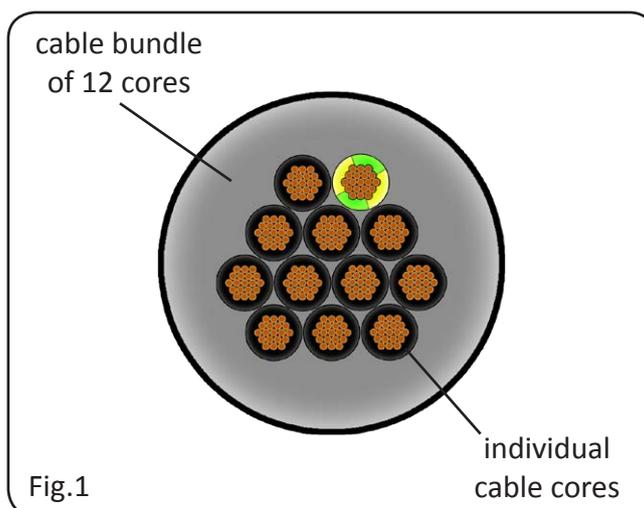
An electronic copy of this guide can be downloaded by scanning the QR code to the right.



IMPORTANT NOTE: Please note that the cable sizes and core quantities shown in this guide are minimum requirements only for Videx equipment. Additional cables and/or cores may be required for third party devices or when additional components are required (i.e. push-to-exit button, trade facility, door monitoring and fail safe locks when an additional psu is required).

CABLE TYPES

The following cable types described in this guide are measured in mm² for the cross sectional area (CSA) of each individual core within the cable bundle, an example can be seen in Fig.1 showing a cross section of a standard 12 core (stranded) 0.5mm² YY PVC multi-core cable.



The following tables in this guide show the distances in metres between system components. Some cable types are categorised using the AWG (American Wire Gauge) and can be converted to mm² using Table A on page 4.

When selecting a particular cable type care must be taken to ensure that excessive voltage drop is avoided and the lowest possible resistance is achieved. Use the following cable types and the tables as a guide to ensure that the best possible performance is achieved.

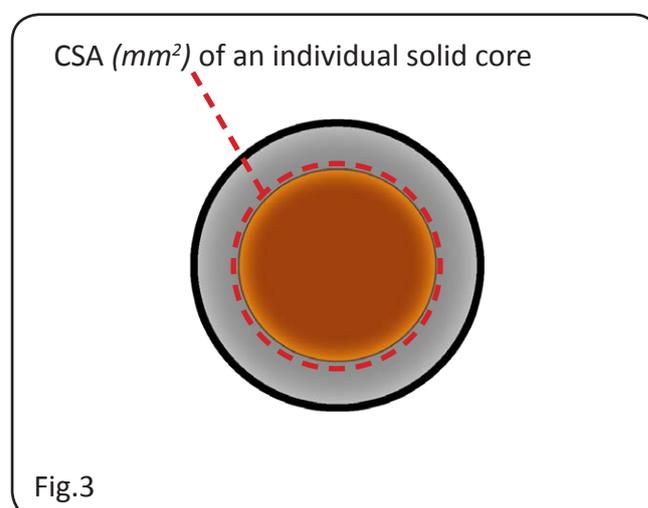
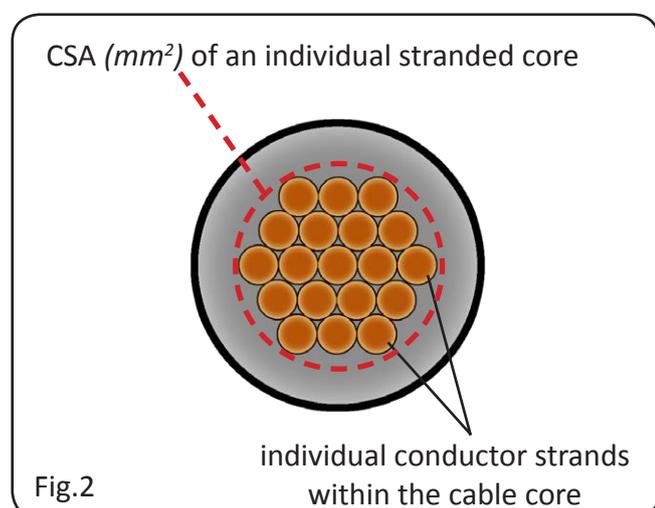
TABLE A

AWG	Diameter (mm)	CSA (mm ²)
13	1.83mm	2.63mm ²
14	1.63mm	2.08mm ²
15	1.45mm	1.65mm ²
16	1.29mm	1.31mm ²
17	1.15mm	1.04mm ²
18	1.02mm	0.82mm ²
19	0.91mm	0.65mm ²
20	0.81mm	0.52mm ²
21	0.72mm	0.41mm ²
22	0.65mm	0.33mm ²
23	0.57mm	0.26mm ²
24	0.51mm	0.20mm ²

The American Wire Gauge (AWG) is a U.S. standard set of wire conductor sizes. The 'gauge' is related to the diameter of an individual core within the cable bundle while the CSA refers to the cross sectional area of that individual core.

An example of an individual stranded cable core is shown in Fig.2 and an individual solid cable core is shown in Fig.3.

BT telephone wire is typically AWG22, AWG24, or AWG26. The higher the gauge number, the smaller the diameter and the thinner the cores.



IMPORTANT NOTE: Please note that in all cases when selecting a cable for any VIDEX intercom system or access control system, the following should NOT be used: Copper Coated Steel (CCS) and Copper Clad Aluminium (CCA). While these types of cable may offer a low cost solution they will have a higher resistance and effect the overall performance of the VIDEX intercom system and are therefore NOT recommended by VIDEX (also see additional notes on page 38).

Acceptable Cables

The following cable types are acceptable on VIDEX intercom systems. Bare solid copper (BSC) or stranded copper cables are suitable to use as they offer low resistance and high conductivity.

Videx CM2 (CSA 0.5mm² AWG 20 - Maximum Resistance 32 Ohm/km, Maximum Capacitance 80nF/km)
 CM2 cable is an unscreened/unshielded one pair (UTP) cable specifically designed to work with the VX2300 'true' two wire digital system.

CW1308 Telephone cable (CSA 0.22mm² AWG 24 - Maximum Resistance 97.8 Ohm/km)
 CW1308 is an internal grade general signal cable for fixed installations which is available in various pair quantities: 2 pair, 3 pair, 4 pair, 6 pair, 10 pair, 15 pair, 20 pair and 25 pair.

CW1308B Telephone cable (CSA 0.22mm² AWG 24 - Maximum Resistance 97.8 Ohm/km)

CW1308B is similar in construction to the standard CW1308 cable but can be used as both an internal or external grade cable which includes a polyester/aluminium foil tape inner sheath and a low smoke halogen free (LSHF) outer jacket (*if used externally must be protected*). It is available in 10 pair and 20 pair.

CW1128 Telephone cable (CSA 0.22mm² AWG 24 - Maximum Resistance 96 Ohm/km)

CW1128 is an external grade poly-filled cable and is suitable for installations where armoured cable is not necessary (*if used externally must be protected*) and is available in 2 pair, 5 pair, 10 pair and 20 pair.

CW1128 / CW1198 Telephone cable (CSA 0.5mm² AWG 20 - Maximum Resistance 91 Ohm/km)

CW1128 / CW1198 is an external grade poly-filled armoured cable for direct burial and is available in 2 pair, 5 pair, 10 pair and 20 pair.

CAT5e (CSA 0.2mm² AWG 24 - DC loop resistance <0.188 Ohm/m, converts to 94 Ohm/km)

CAT5e is an internal grade cable and is available in 4 pair. Please note that if CAT5e cable is going to be used then the DC characteristics above must be met by measuring the resistance of the cable directly or by consulting the manufacturer's datasheet.

YY PVC Control Cable

(CSA 0.5mm² AWG 20 - Maximum Resistance 39 Ohm/km)

(CSA 0.75mm² AWG 18 - Maximum Resistance 26 Ohm/km)

(CSA 1.0mm² AWG 17 - Maximum Resistance 19.5 Ohm/km)

(CSA 1.5mm² AWG 15 - Maximum Resistance 13.3 Ohm/km)

(CSA 2.5mm² AWG 13 - Maximum Resistance 8 Ohm/km)

YY PVC control cable is an internal or external grade multi-core cable (*if used externally must be protected*) and is available in 2 core, 4 Core, 7 Core, 12 Core & 18 Core. Each cable comes with numbered cores in white on a black sheath and also includes a green/yellow earth core.

If in any doubt about selecting and using a suitable cable for installing a VIDEX intercom system then it is recommended that you consult the manufacturer's datasheet for confirmation or call your cable supplier.

Video System Cables

On video systems which do not use a balanced video signal (V1/V2) then a coax video signal can be used. A coax cable has a centre core (*signal wire*) surrounded by an insulation layer followed by a braided shield and then an outer jacket. When selecting a suitable coaxial cable it is recommended that a bare copper (BC) type of coax cable is used. Copper coated steel (CCS) and copper clad aluminium (CCA) versions should **not** be used.

Depending on the cable distance between system components the following coax cables can be used.

RG59(BC)

RG59(BC) is an internal grade coax cable and can be used with distances of up to 200m.

RG11(BC)

RG11(BC) is an internal grade coax cable and can be used with distances of up to 600m.

CT100

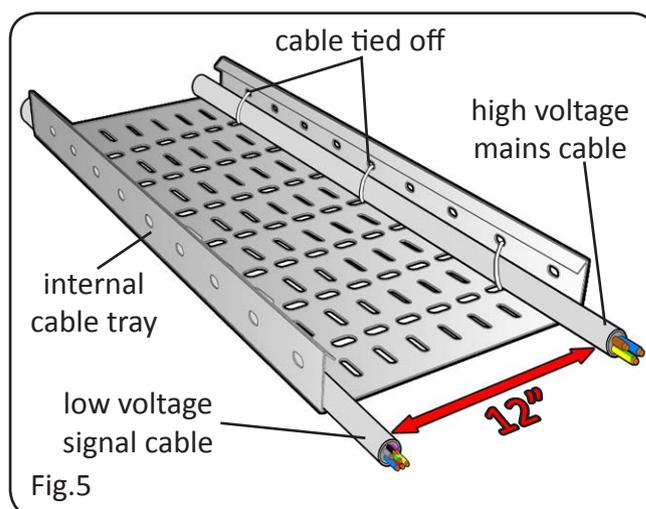
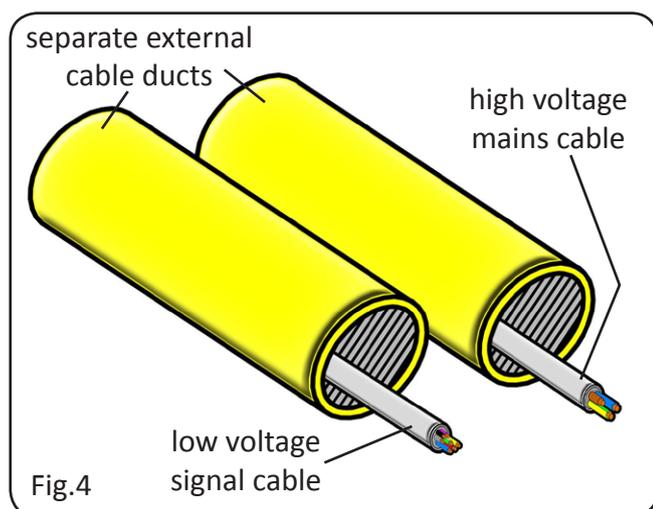
CT100 is an external grade (*protected*) coax cable and can be used with distances of up to 200m.

CT125

CT125 is an external grade (*protected*) coax cable and can be used with distances of up to 600m.

High Voltage and Low Voltage Cables

When laying high voltage cables (*mains*) and low voltage cables (*intercom and signal*) ideally they should always be routed separately in different cable trays or ducting wherever possible as shown in Fig.4. However if for any reason they are in the same cable tray or ducting whether internally or externally they should always be kept separate within the tray or ducting itself, typically there should be a gap of approximately 12" (*inches*) between the sets of high and low voltage cables as shown in Fig.5. If necessary they should be cable tied off to keep them as far apart as possible.



AUDIO SYSTEMS (3+1 and 4+1)

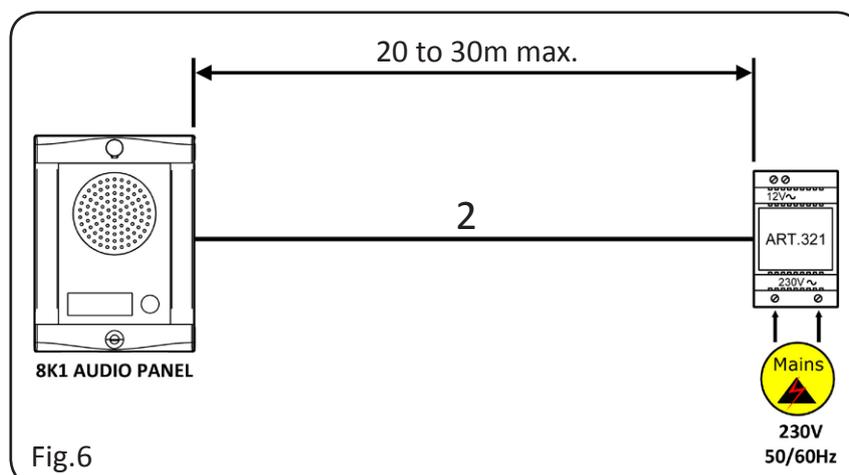
The following tables show the cable core requirements and recommended cable types that can be used for basic 3+1 and 4+1 audio systems. The distances shown in all the tables is the distance between the Videx intercom panel (*outdoor station*) to the furthest audio device (*audiophone, apartment station etc.*) inside. Systems of this type include modular and VR traditional audio systems, 4K, 8K, VR4K series and VR120DK audio kits.

Power Supply, Lock Release and Push to Exit Connections

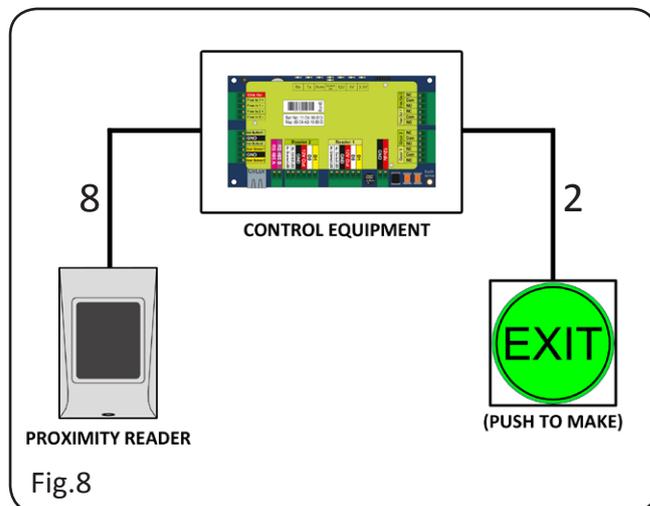
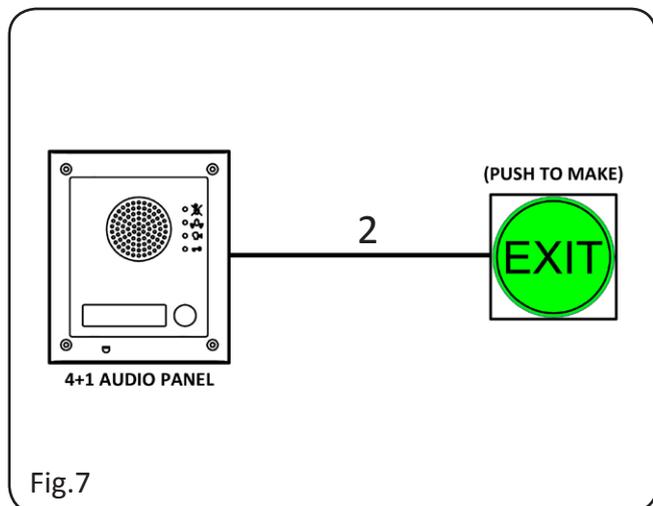
Table A

Connection	20m	30m	Cable Type
Power Supply	0.5mm ²	0.75mm ²	2 core YY @ 0.5mm ² or 0.75mm ²
Lock Release	0.5mm ²	0.75mm ²	
Push to Exit	0.5mm ²	0.75mm ²	

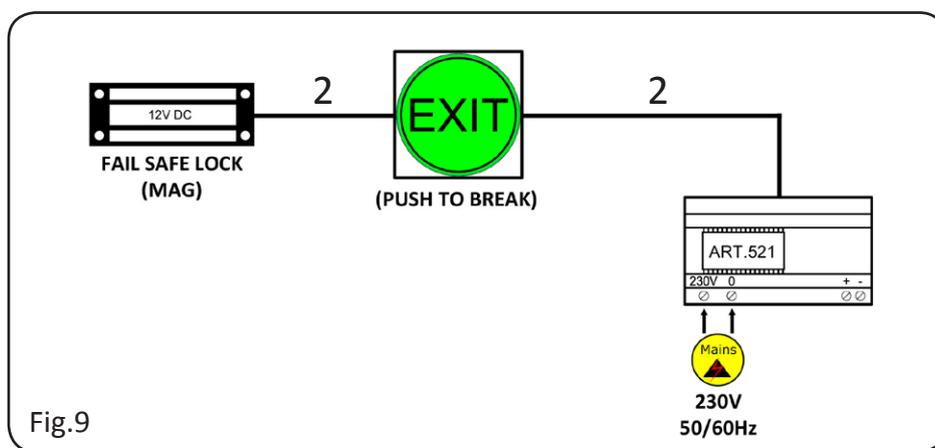
Ideally the power supply should be located as close to the door panel as possible, typically between 20 to 30m as shown in Fig.6. The maximum acceptable resistance for the above connections = 3 Ohms or less for best possible performance.



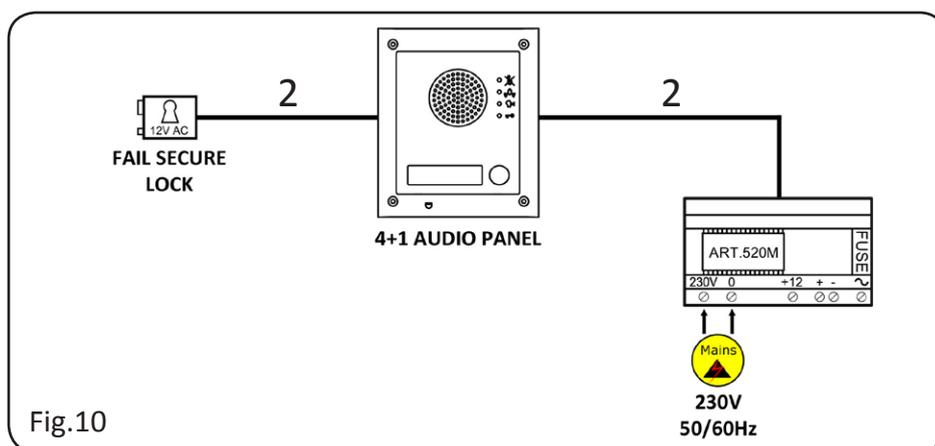
In most cases the push to exit button can be wired directly from the door panel if the exit button is configured as a 'push-to-make' (*normally open going closed*), see Fig.7. However if any control equipment is being installed such as a proximity system then the exit button can be cabled back to the push to exit input on the proximity system instead as shown in Fig.8.



Another option to consider when cabling for an exit button is that if a fail safe lock release, e.g. a mag lock, is being fitted then the exit button can be wired in series with the lock circuit as long as the exit button is configured as a 'push-to-break' (*normally closed going open*) as shown in Fig.9.



In most cases if a fail secure lock release is being fitted then it can be wired back to the door panel as shown in Fig.10.



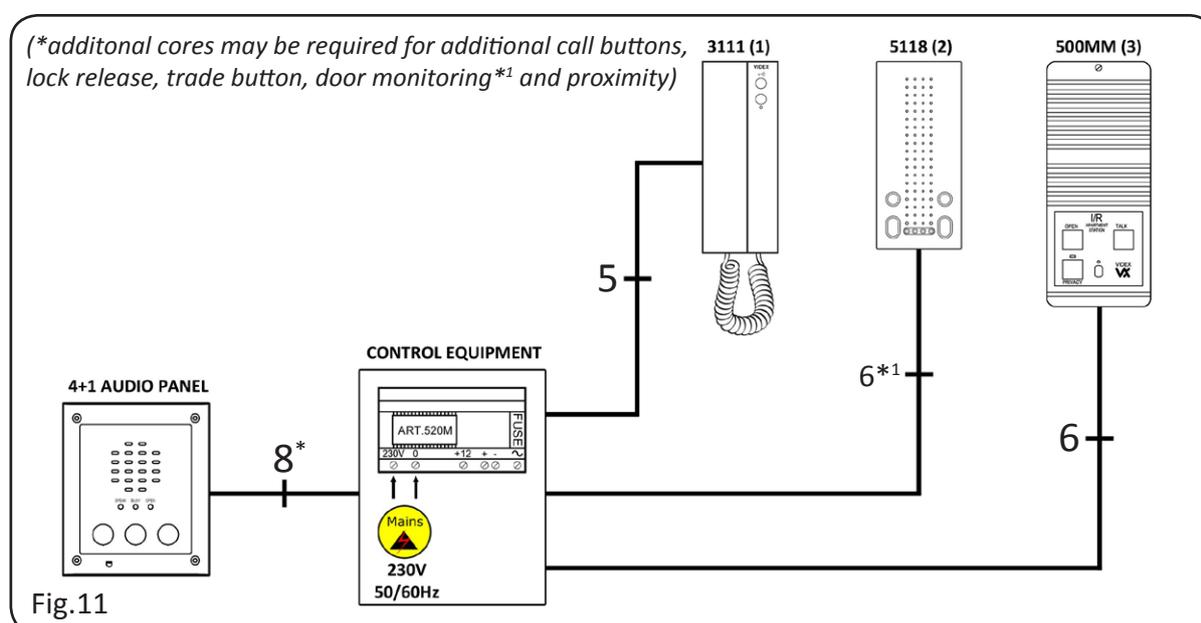
Audiophones and Apartment Stations

Table B below shows the minimum number of cores required for the 3000 series audiophones and the 5000 series apartment stations including the Art.500MM apartment station. Cables from the intercom door panel and audiophones/apartment stations can be wired back to a central point where the control equipment is located as shown in Fig.11.

Table B

Model	Min. Cores	50m	100m	200m	300m	400m	500m
Art.3011	4	4 pair CW1308 or CAT5e	6 pair CW1308 or 7 core 0.5mm ² YY	10 pair CW1308 or 7 core 0.5mm ² YY	12 pair CW1308 or 7 core 0.75mm ² YY	7 core 1.0mm ² YY	7 core 1.5mm ² YY
Art.3021	5	4 pair CW1308 or CAT5e	6 pair CW1308 or 7 core 0.5mm ² YY	10 pair CW1308 or 7 core 0.5mm ² YY	12 pair CW1308 or 7 core 0.75mm ² YY	7 core 1.0mm ² YY	7 core 1.5mm ² YY
Art.3111	5	4 pair CW1308 or CAT5e	6 pair CW1308 or 7 core 0.5mm ² YY	10 pair CW1308 or 7 core 0.5mm ² YY	12 pair CW1308 or 7 core 0.75mm ² YY	7 core 1.0mm ² YY	7 core 1.5mm ² YY
Art.3101	5	4 pair CW1308 or CAT5e	6 pair CW1308 or 7 core 0.5mm ² YY	10 pair CW1308 or 7 core 0.5mm ² YY	12 pair CW1308 or 7 core 0.75mm ² YY	7 core 1.0mm ² YY	7 core 1.5mm ² YY
Art.3102	5	4 pair CW1308 or CAT5e	6 pair CW1308 or 7 core 0.5mm ² YY	10 pair CW1308 or 7 core 0.5mm ² YY	12 pair CW1308 or 7 core 0.75mm ² YY	7 core 1.0mm ² YY	7 core 1.5mm ² YY
Art.3102/G	7	4 pair CW1308 or CAT5e	6 pair CW1308 or 7 core 0.5mm ² YY	10 pair CW1308 or 7 core 0.5mm ² YY	12 pair CW1308 or 7 core 0.75mm ² YY	7 core 1.0mm ² YY	7 core 1.5mm ² YY
Art.3112	5	4 pair CW1308 or CAT5e	6 pair CW1308 or 7 core 0.5mm ² YY	10 pair CW1308 or 7 core 0.5mm ² YY	12 pair CW1308 or 7 core 0.75mm ² YY	7 core 1.0mm ² YY	7 core 1.5mm ² YY
Art.3113	6	4 pair CW1308 or CAT5e	6 pair CW1308 or 7 core 0.5mm ² YY	10 pair CW1308 or 7 core 0.5mm ² YY	12 pair CW1308 or 7 core 0.75mm ² YY	7 core 1.0mm ² YY	7 core 1.5mm ² YY
Art.3114	7	4 pair CW1308 or CAT5e	6 pair CW1308 or 7 core 0.5mm ² YY	10 pair CW1308 or 7 core 0.5mm ² YY	12 pair CW1308 or 7 core 0.75mm ² YY	7 core 1.0mm ² YY	7 core 1.5mm ² YY
Art.5112	6	4 pair CW1308 or CAT5e	6 pair CW1308 or 7 core 0.5mm ² YY	10 pair CW1308 or 7 core 0.5mm ² YY	12 pair CW1308 or 7 core 0.75mm ² YY	7 core 1.0mm ² YY	7 core 1.5mm ² YY
Art.5118	6	4 pair CW1308 or CAT5e	6 pair CW1308 or 7 core 0.5mm ² YY	10 pair CW1308 or 7 core 0.5mm ² YY	12 pair CW1308 or 7 core 0.75mm ² YY	7 core 1.0mm ² YY	7 core 1.5mm ² YY
Art.500MM	6	4 pair CW1308 or CAT5e	6 pair CW1308 or 7 core 0.5mm ² YY	10 pair CW1308 or 7 core 0.5mm ² YY	12 pair CW1308 or 7 core 0.75mm ² YY	7 core 1.0mm ² YY	7 core 1.5mm ² YY

Whenever possible the speech line connections 1 and 2 should be twisted with the speech GND connection as pairs. The maximum acceptable resistance for power terminal connections and lock release connections = 3 Ohms or less, for all other connections = 10 Ohms or less for best possible performance.



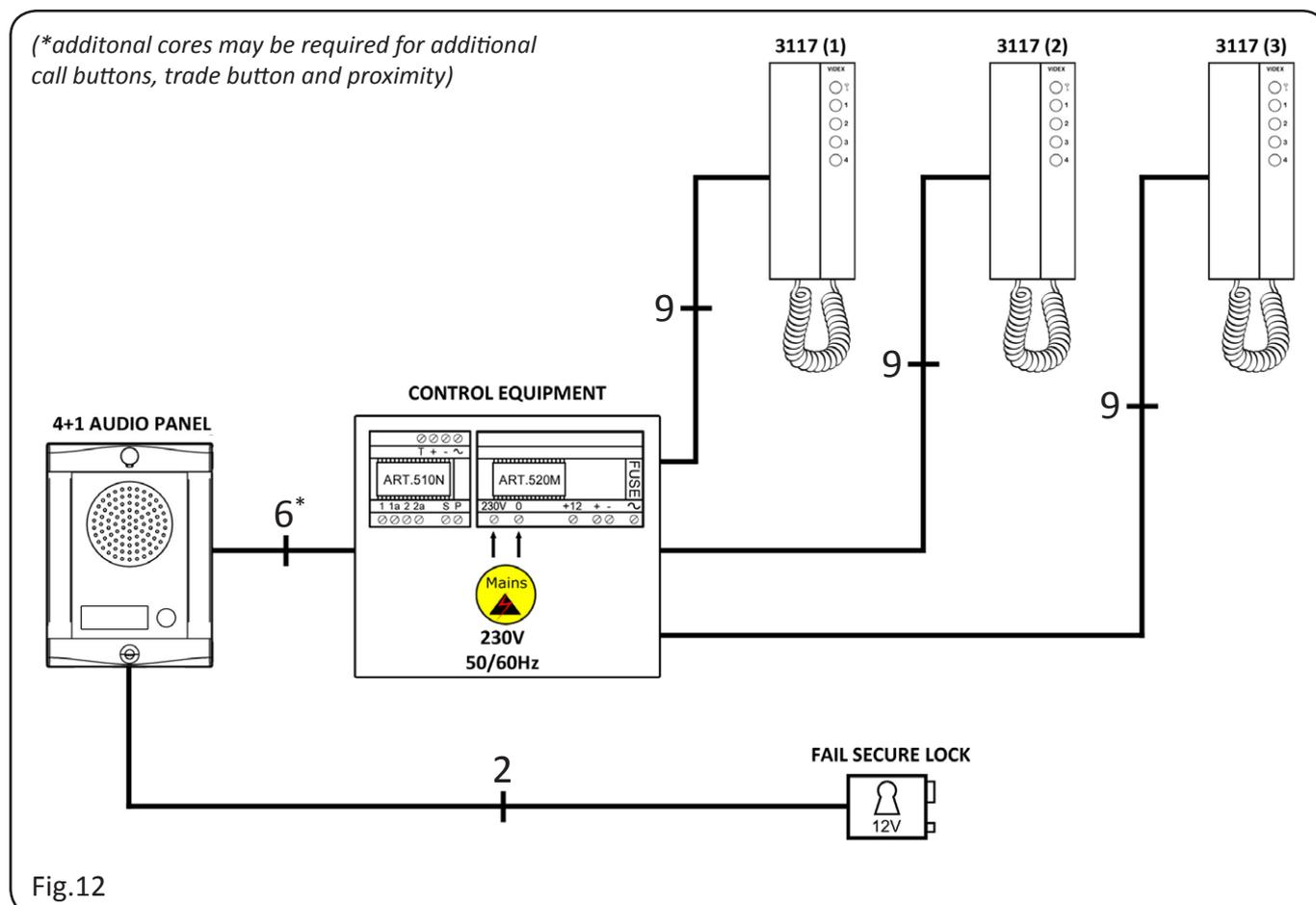
AUDIO INTERCOMMUNICATION

Table C below shows the minimum number of cores required for the 3000 series intercommunicating audiophone the Art.3117. The minimum number of cores required is determined by the total number of intercommunicating audiophones on the system. For example a 1 way audio intercom system with at least two Art.3117 intercommunicating audiophones will require a minimum of 8 cores per audiophone.

It is recommended that the cabling for the audiophones for this type of system are cabled back to a central point where the control equipment is so that all the common connections can be made there. The intercom door panel can also be cabled back to the central point for best possible performance, an example of a 1 door 1 button audio intercommunication system with 3x Art.3117 audiophones is shown in Fig.12 below.

Table C

Model	Min. number of audiophones on system	Min. Cores per audiophone	50m	100m	200m	300m
Art.3117	2	8	4 pair CW1308 or CAT5e	10 pair CW1308 or 12 core 0.5mm ² YY	20 pair CW1308 or 12 core 0.75mm ² YY	20 pair CW1308 or 12 core 1.0mm ² YY
	3	9	6 pair CW1308	10 pair CW1308 or 12 core 0.5mm ² YY	20 pair CW1308 or 12 core 0.75mm ² YY	20 pair CW1308 or 12 core 1.0mm ² YY
	4	10	6 pair CW1308	10 pair CW1308 or 12 core 0.5mm ² YY	20 pair CW1308 or 12 core 0.75mm ² YY	20 pair CW1308 or 12 core 1.0mm ² YY
	5	11	6 pair CW1308	10 pair CW1308 or 12 core 0.5mm ² YY	20 pair CW1308 or 12 core 0.75mm ² YY	20 pair CW1308 or 12 core 1.0mm ² YY



Whenever possible the speech line connections 1 and 2 should be twisted with the speech GND connection as pairs. The maximum acceptable resistance for power terminal connections and lock release connections = 3 Ohms or less, for all other connections = 10 Ohms or less for best possible performance.

Please note that when a single core connection is not sufficient enough to carry the signal then it is perfectly acceptable to double up on the core connection to increase the CSA of the core and reduce the overall resistance of the connection between the system components.

AUDIO SENTRY SYSTEMS (5+1)

Sentry System Audiophones and Apartment Stations

Table D below shows the cable core requirements and recommended cable types that can be used for 5+1 audio Sentry systems (*Sentry and Sentry 1*). The table below shows the minimum number of cores required for the 3000 series range of Videx Sentry system audiophones and the minimum number of cores required for the 500 series apartment stations.

Table D

Model	Min. Cores	50m	100m	200m	300m	400m
Art.3121	6	4 pair CW1308 or CAT5e	6 pair CW1308 or 7 core 0.5mm ² YY	10 pair CW1308 or 7 core 0.5mm ² YY	7 core 0.75mm ² YY	7 core 1.0mm ² YY
Art.3123	7	4 pair CW1308 or CAT5e	10 pair CW1308 or 7 core 0.5mm ² YY	10 pair CW1308 or 7 core 0.5mm ² YY	7 core 0.75mm ² YY	7 core 1.0mm ² YY
Art.3125	8	6 pair CW1308	10 pair CW1308 or 12 core 0.5mm ² YY	10 pair CW1308 or 12 core 0.5mm ² YY	12 core 0.75mm ² YY	12 core 1.0mm ² YY
Art.3126	8	6 pair CW1308	10 pair CW1308 or 12 core 0.5mm ² YY	10 pair CW1308 or 12 core 0.5mm ² YY	12 core 0.75mm ² YY	12 core 1.0mm ² YY
Art.500	6	4 pair CW1308 or CAT5e	6 pair CW1308 or 7 core 0.5mm ² YY	10 pair CW1308 or 7 core 0.5mm ² YY	7 core 0.75mm ² YY	7 core 1.0mm ² YY
Art.500M	8	4 pair CW1308 or CAT5e	10 pair CW1308 or 12 core 0.5mm ² YY	10 pair CW1308 or 12 core 0.5mm ² YY	12 core 0.75mm ² YY	12 core 1.0mm ² YY
Art.500ST	8	4 pair CW1308 or CAT5e	10 pair CW1308 or 12 core 0.5mm ² YY	10 pair CW1308 or 12 core 0.5mm ² YY	12 core 0.75mm ² YY	12 core 1.0mm ² YY
Art.500MM	7	4 pair CW1308 or CAT5e	10 pair CW1308 or 12 core 0.5mm ² YY	10 pair CW1308 or 7 core 0.5mm ² YY	7 core 0.75mm ² YY	7 core 1.0mm ² YY

Whenever possible the speech line connections 1 and 2 should be twisted with the speech GND connection as pairs. The maximum acceptable resistance for power terminal connections and lock release connections = 3 Ohms or less, for all other connections = 10 Ohms or less for best possible performance.

It is recommended on sentry and sentry 1 systems to cable the intercom door panel back to a central point where the sentry control cabinet is located and also cable the audiophones on the system back to the same central point and make all the common connections there. An example of cabling for a Sentry system is shown in Fig.13 and an example of Sentry 1 cabling is shown in Fig.14 (*both on page 11*).

Additional information regarding cabling can be found in the following Technical Manuals: Sentry Technical Manual Edition 1.6, Sentry 1 Technical Manual Edition 1.6.

For older sentry systems (Sentry 2 and Sentry 3) additional information regarding cabling can be found in the following Technical Manuals: Sentry 2 Technical Manual and the VX2100 [Sentry 3] Digital System.

(*additional cores may be required for additional call buttons, trade button, door monitoring and proximity)

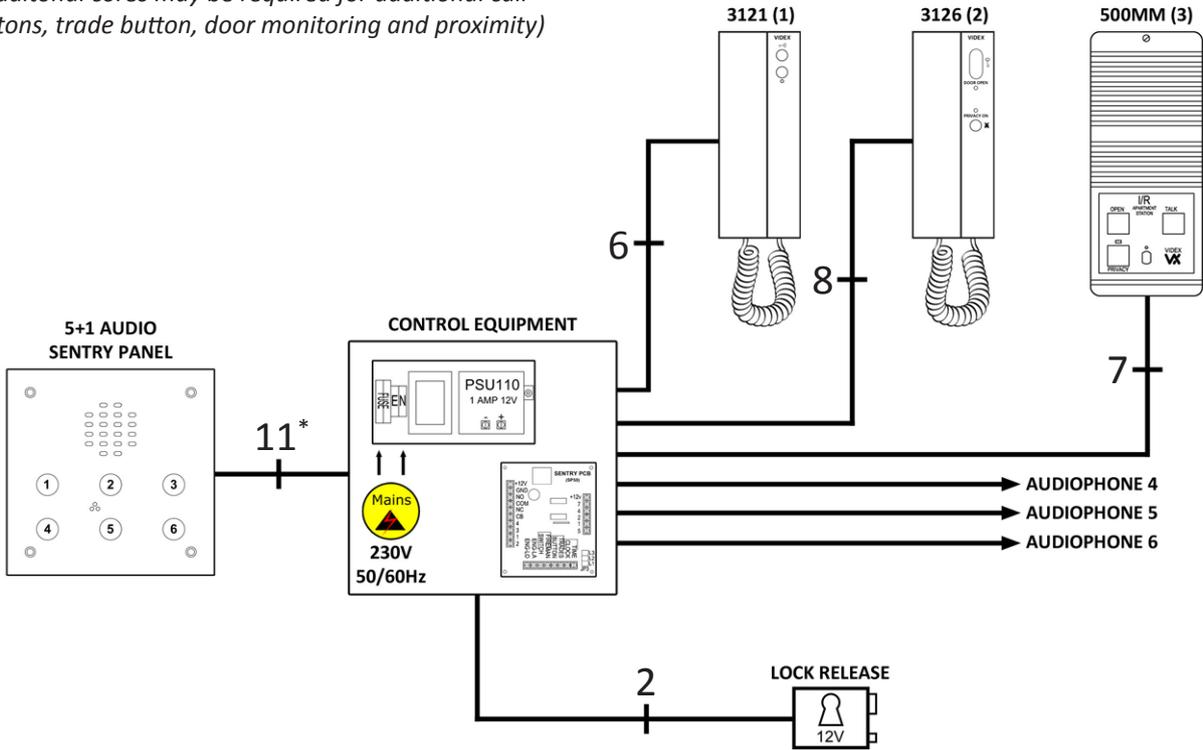


Fig.13

(*additional cores may be required for additional call buttons, trade button, door monitoring and proximity)

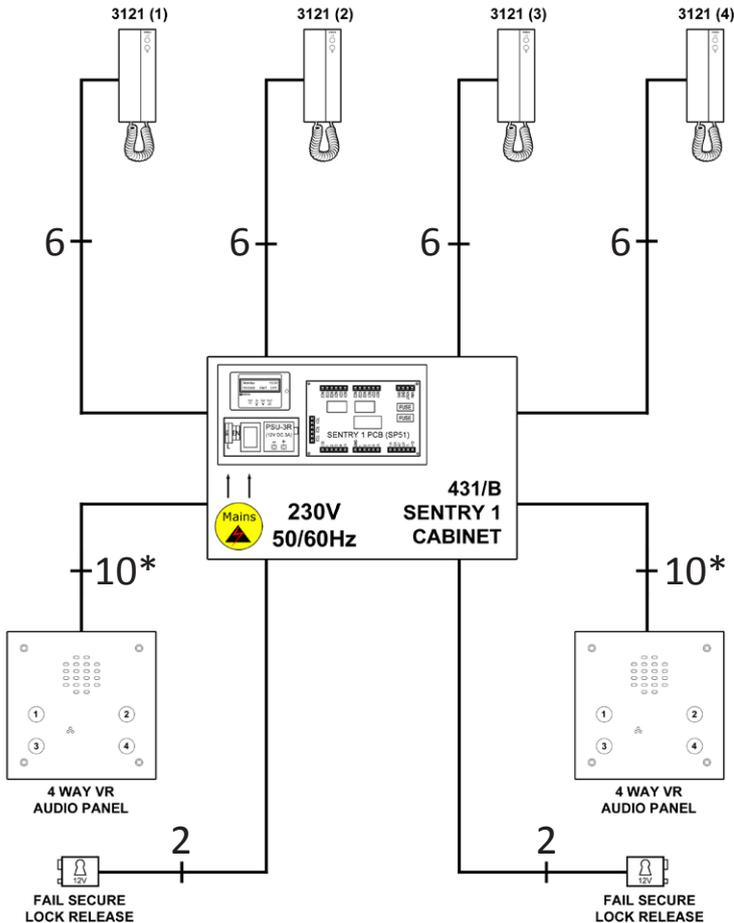


Fig.14

DIGITAL VX2200 AUDIO SYSTEM

The VX2200 digital system uses a 2 core databus connection (*L and -*) that requires a maximum acceptable resistance of 7.5 Ohms or less. For the databus connections a twisted pair cable should be used. Doubling up on core connections to increase the CSA of the connection and reduce the overall resistance is acceptable, however it should be noted that wherever possible no more than 2 cores per connection should be used as this can cause an increase in capacitance of the cable.

Digital System (VX2200) Audiophones, Apartment Stations and Kristallo

Table E (see page 13) shows the minimum number of cores required for the 3000 series range of audiophones, the 5000 series apartment stations (including VR) and the audio Kristallo units for the VX2200 digital system. The recommended way to cable the VX2200 digital system is in a 'star' configuration as it uses a common bus connection. Cables from the intercom door station can be wired back to a central point where the control equipment is located and then a common bus connection can be made to local junction points and then 'star' wired from the junction point to each handset on the system. Fig.15 below shows an example of this.

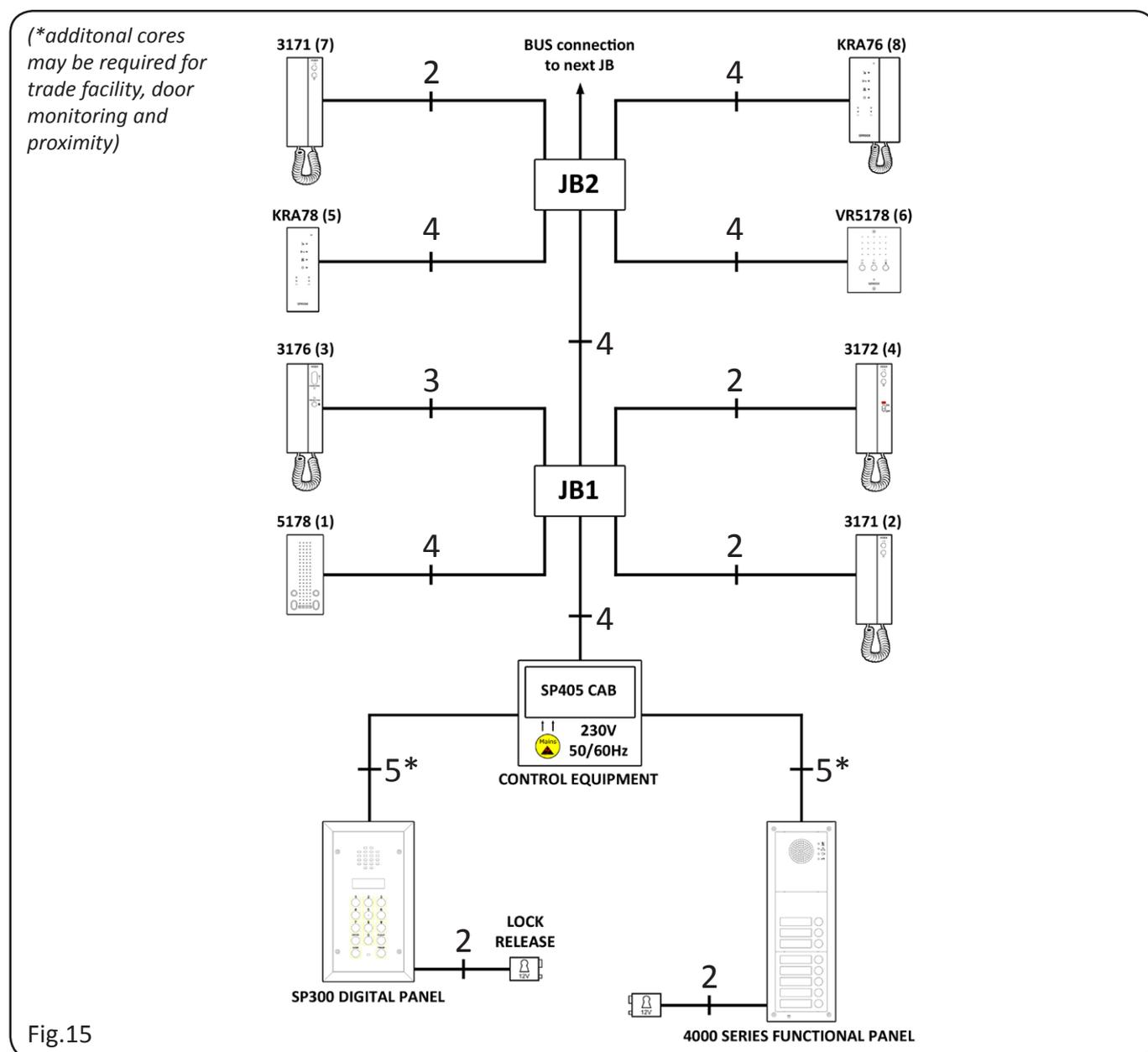


Table E

Model	Min. Cores	50m	100m	200m	300m	400m	500m
Art.3171	2	3 pair CW1308 or CAT5e	4 pair CW1308 or CAT5e	4 pair CW1308 or 4 core 0.5mm ² YY	4 core 0.75mm ² YY	4 core 1.0mm ² YY	4 core 1.5mm ² YY
Art.3172	2	3 pair CW1308 or CAT5e	4 pair CW1308 or CAT5e	4 pair CW1308 or 4 core 0.5mm ² YY	4 core 0.75mm ² YY	4 core 1.0mm ² YY	4 core 1.5mm ² YY
Art.3176	3	4 pair CW1308 or CAT5e	4 pair CW1308 or CAT5e	6 pair CW1308 or 4 core 0.5mm ² YY	4 core 0.75mm ² YY	4 core 1.0mm ² YY	4 core 1.5mm ² YY
Art.5178	4	4 pair CW1308 or CAT5e	4 pair CW1308 or CAT5e	6 pair CW1308 or 4 core 0.5mm ² YY	4 core 0.75mm ² YY	4 core 1.0mm ² YY	4 core 1.5mm ² YY
Art.VR5178	4	4 pair CW1308 or CAT5e	4 pair CW1308 or CAT5e	6 pair CW1308 or 4 core 0.5mm ² YY	4 core 0.75mm ² YY	4 core 1.0mm ² YY	4 core 1.5mm ² YY
Art.KRA76	4	4 pair CW1308 or CAT5e	4 pair CW1308 or CAT5e	6 pair CW1308 or 4 core 0.5mm ² YY	4 core 0.75mm ² YY	4 core 1.0mm ² YY	4 core 1.5mm ² YY
Art.KRA78	4	4 pair CW1308 or CAT5e	4 pair CW1308 or CAT5e	6 pair CW1308 or 4 core 0.5mm ² YY	4 core 0.75mm ² YY	4 core 1.0mm ² YY	4 core 1.5mm ² YY

(More information regarding cabling can be found in the following Technical Manuals: VX2200 Digital System Technical Manual Edition 2014 Version 1.0 and VX2200 Block Diagram Manual Edition 1.2).

The cable requirements shown for the audiophones, apartment stations and audio Kristallo units in the previous tables advise using CW1308, CAT5e and YY control cable as recommended by Videx, however it is perfectly acceptable to use equivalent cable types if any of these cables cannot be sourced providing they meet the cable characteristics of those described on pages 3 - 5.

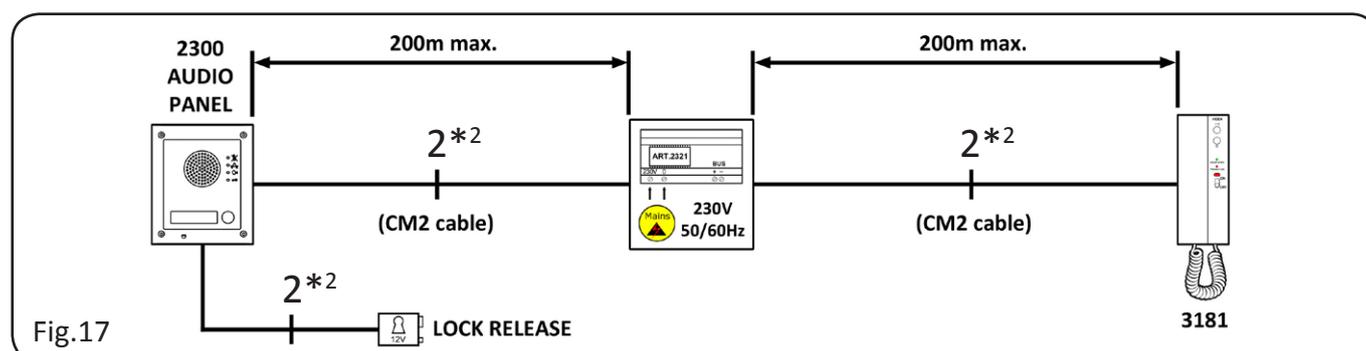
DIGITAL VX2300 AUDIO SYSTEM

The VX2300 digital system is a ‘true’ two wire system. The cable to be used must be unshielded cable and must be a twisted pair cable (UTP). Videx do not recommend using shielded or screened cable as this can cause high capacitance on the connections and interfere with the system operation. Only a single core out of the twisted pair should be used for each terminal connection. Table F below shows the cable requirements for 3000 series audiophones and 5000 series apartment stations for this system.

Table F

Model	Min. Cores	*1Max. distance up to 70m	*1Max. distance up to 200m
Art.3181	2*2	CAT5e (UTP) or CW1308 *3(AWG24, resistance ≤ 8 Ohms, capacitance ≤ 4.9 nF)	Videx CM2 (twisted pair cable) *3(AWG24, resistance ≤ 3.2 Ohms, capacitance ≤ 8 nF)
Art.3183	2	CAT5e (UTP) or CW1308 *3(AWG24, resistance ≤ 8 Ohms, capacitance ≤ 4.9 nF)	Videx CM2 (twisted pair cable) *3(AWG24, resistance ≤ 3.2 Ohms, capacitance ≤ 8 nF)
Art.5188	2*2	CAT5e (UTP) or CW1308 *3(AWG24, resistance ≤ 8 Ohms, capacitance ≤ 4.9 nF)	Videx CM2 (twisted pair cable) *3(AWG24, resistance ≤ 3.2 Ohms, capacitance ≤ 8 nF)

The power supply for this system (Art.2321 and Art.2321P) should be located between the intercom panel outside and the audiophones inside. Both the intercom panel and the audiophones should cable directly back to the power supply as shown in Fig.17 below.



*1 The maximum distances shown are based on the distance between the outdoor intercom panel and the power supply and the distance between the power supply and the audiophone. For example if a power supply was located at a central point then using the Videx CM2 cable an audiophone or apartment station can be mounted up to 200m away in one direction in the building and an outdoor intercom panel can be mounted up to 200m in the opposite direction giving an overall total cable distance from outdoor intercom panel to the audiophone or apartment station inside the building of 400m.

*2 An additional cable core will be required if the door open LED (DOL) is connected.

*3 The resistance and capacitance values are based on 100m length of cable.

(More information regarding cabling can be found in the following Technical Manual: 2 Wire Audio/ Video Door Entry System Edition 2014 Rev 1.1).



Art.5118
Art.5178
Art.5188

Art.5112

Art.VR5178



Art.KRA78W Art.KRA76B

VIDEO SYSTEMS

Video Kits

The following tables show the cable requirements for the following non-coax (NC) video kits, SMVK, VK6N, VK4K, VK8K and CVR4KV (2 button only) video kits. A twisted pair cable should be used for the balanced video signal V1 and V2 connections.

For each of the above video kits the power supply (Art.850K) must be mounted within 20m of the videophone. If using an Art.850K/MV power supply and an Art.3551 videophone (only available with the SMVK and VK6N memory video kits) then an additional two cores will be required from the power supply to the videophone. Table G below shows the recommended cable to use.

Table G

Power Supply	20m (max.)
Art.850K	2 core 1.0mm ² flex or 2 core 1.0mm ² YY
Art.850K/MV	4 core 1.0mm ² flex or 4 core 1.0mm ² YY

The maximum acceptable resistance for the connections in Table G = 3 Ohms or less for best possible performance.

Fig.18A shows the power supply connection for the above video kits.

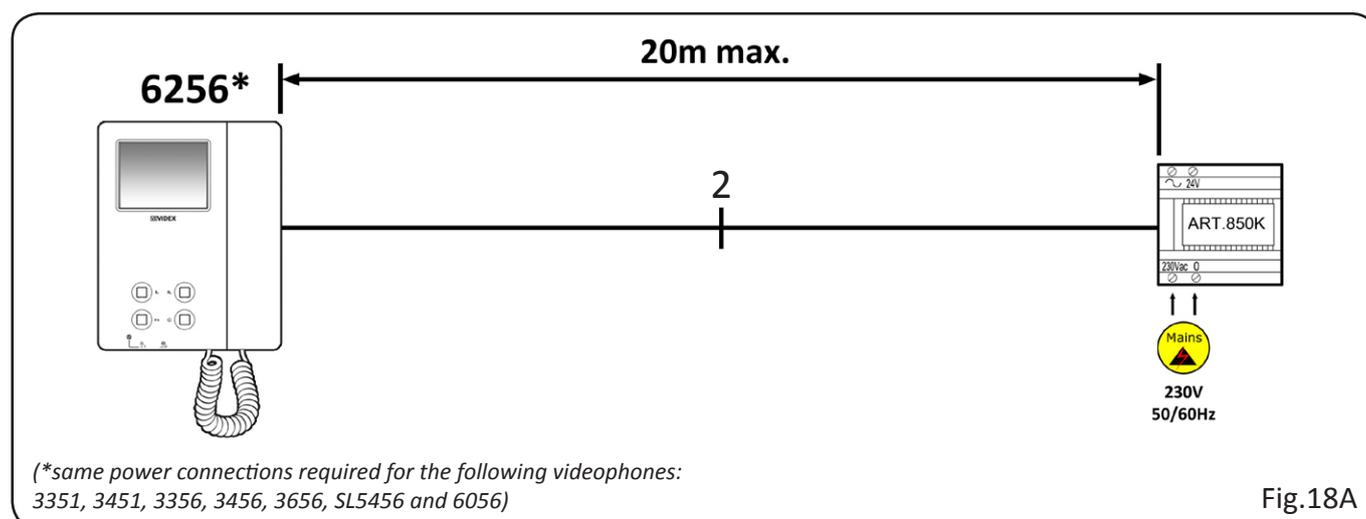
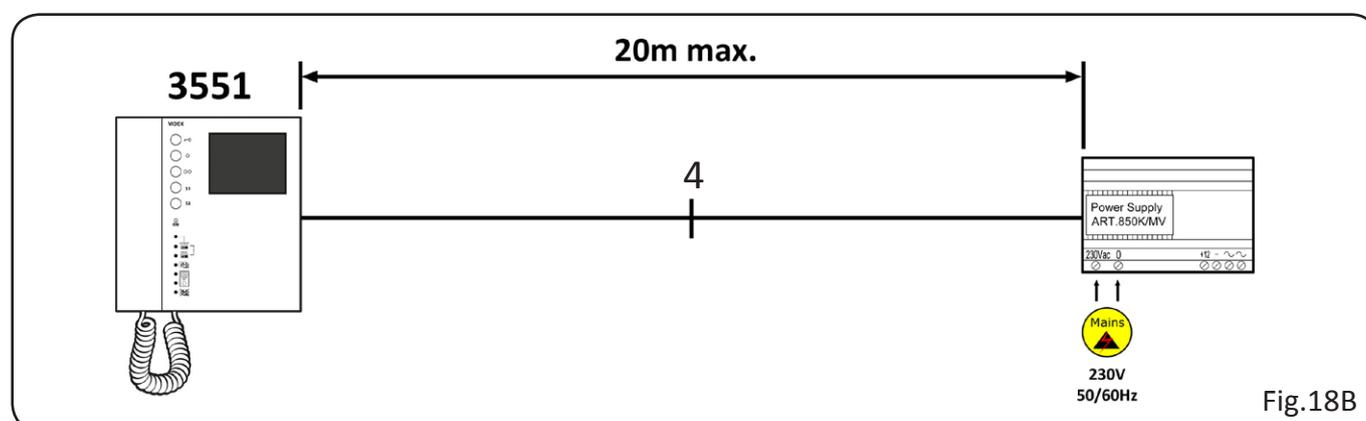


Fig.18B shows the power supply connection for an SMVK and VK6N memory video kits.



SMVK and VK6N Video Kits

Table H below shows the minimum cable core requirements for the SMVK and VK6N video kits using the Art.3351, Art.3451 and Art.3551 videophones. The number of cores required refers to the connections between the videophone inside and the intercom panel outside.

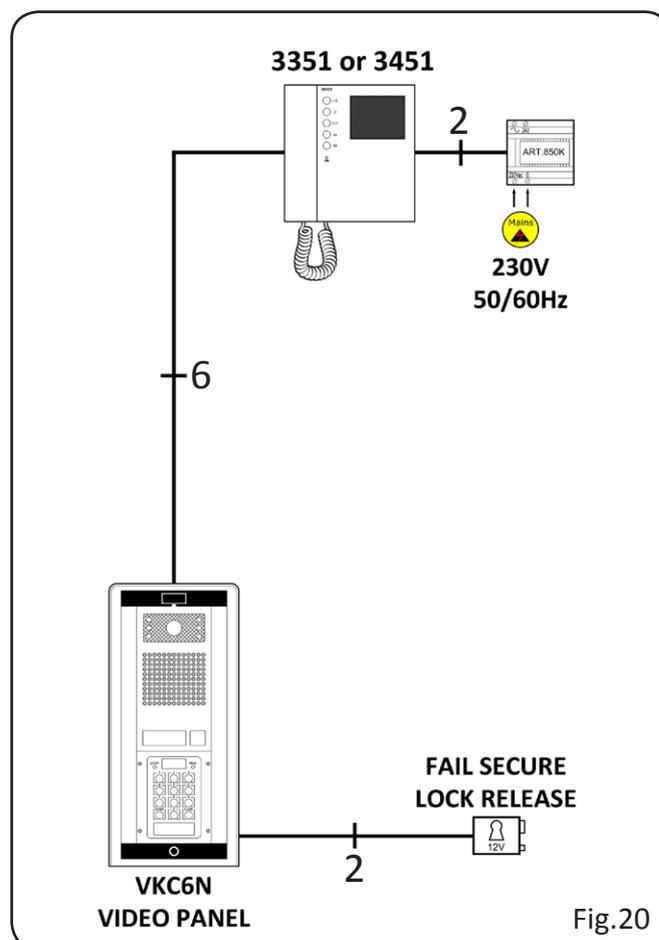
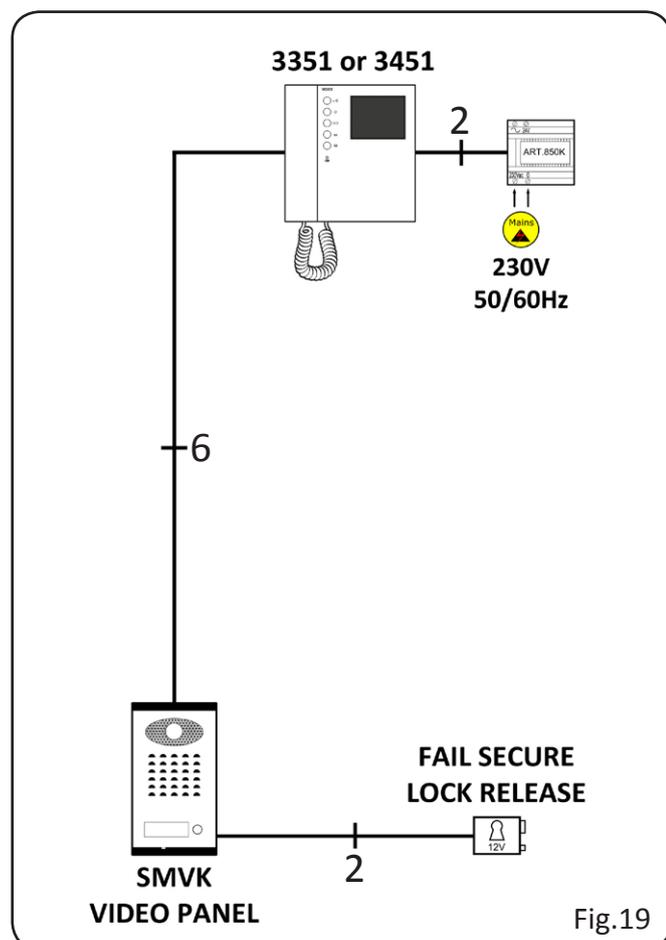
Table H

Model	Min. Cores	50m	100m	200m	300m	400m
Art.3351	6	4 pair CW1308 or CAT5e	10 pair CW1308 or 12 core 0.5mm ² YY* ⁴	12 core 0.75mm ² YY* ⁴	not recommended	not recommended
Art.3451	6	4 pair CW1308 or CAT5e	10 pair CW1308 or 12 core 0.5mm ² YY* ⁴	12 core 0.75mm ² YY* ⁴	not recommended	not recommended
Art.3551	6	4 pair CW1308 or CAT5e	10 pair CW1308 or 12 core 0.5mm ² YY* ⁴	12 core 0.75mm ² YY* ⁴	not recommended	not recommended

Whenever possible the speech line connections 1(6) and 2(2) should be twisted with the GND connection as pairs. The maximum acceptable resistance for power terminal connections and lock release connections = 3 Ohms or less, for all other connections = 10 Ohms or less for best possible performance. The Balanced video signal V1 and V2 should also be twisted pairs.

*⁴ Double up on the connections for power (+ and -) if using YY control cable. Also use cores 1, 2 and 3 for connections V1, V2 and GND respectively.

Fig.19 shows the cabling for an SMVK video kit and Fig.20 shows the cabling for a VK6N video kit.



(More information regarding cabling can be found in the following Technical Manuals: SMVK Smart Series Technical Manual and VK6N Series Technical Manual).

VK4K, CVK4K, VK8K, CVK8K and CVR4KV (up to 2 button only) Video Kits

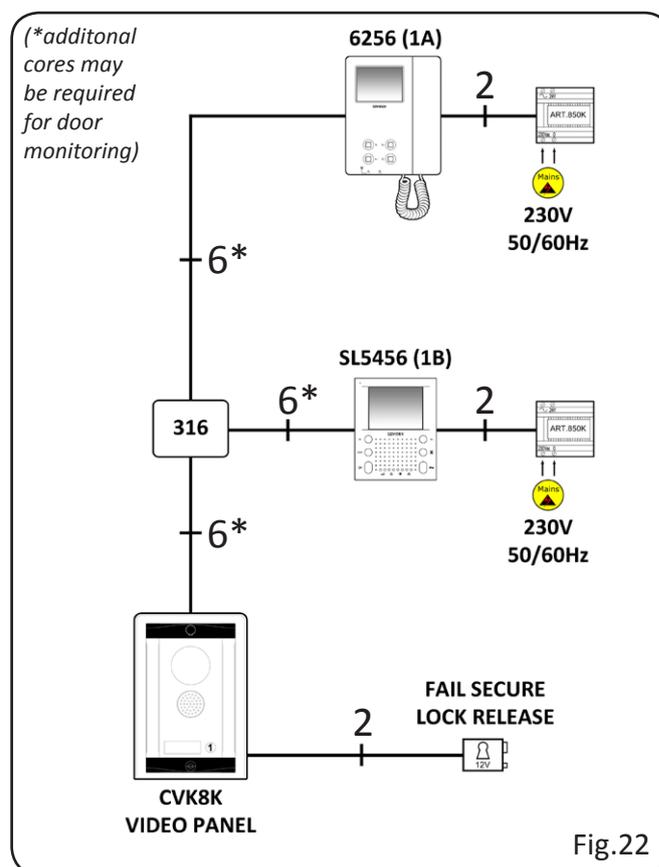
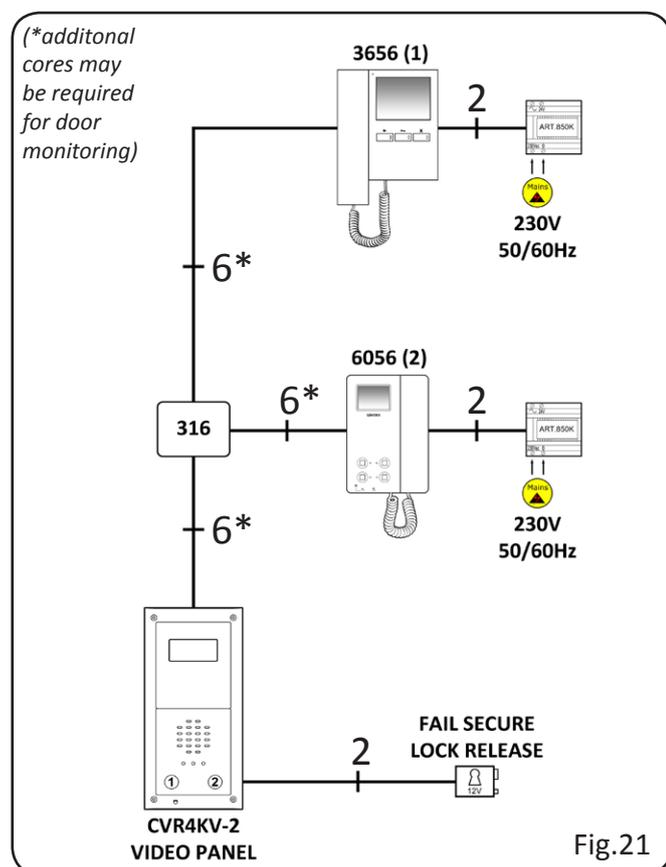
Table I shows the minimum cable core requirements for the VK4K, CVK4K, VK8K and CVK8K video kits using 3000, 3600, 5000 series handsfree eclipse, 6000 and 6200 series videophones. The number of cores required refers to the connections between the videophone inside and the intercom panel outside. Fig.21 and Fig.22 shows the minimum cable connections for a CVR4KV and CVK8K video kits respectively.

Table I

Model	Min. Cores	50m	100m	200m	300m	400m
Art.3356	6	4 pair CW1308 or CAT5e	10 pair CW1308 or 12 core 0.5mm ² YY* ⁵	12 core 0.75mm ² YY* ⁵	not recommended	not recommended
Art.3456	6	4 pair CW1308 or CAT5e	10 pair CW1308 or 12 core 0.5mm ² YY* ⁵	12 core 0.75mm ² YY* ⁵	not recommended	not recommended
Art.3656	6	4 pair CW1308 or CAT5e	10 pair CW1308 or 12 core 0.5mm ² YY* ⁵	12 core 0.75mm ² YY* ⁵	not recommended	not recommended
Art.SL5456	6	4 pair CW1308 or CAT5e	10 pair CW1308 or 12 core 0.5mm ² YY* ⁵	12 core 0.75mm ² YY* ⁵	not recommended	not recommended
Art.6056	6	4 pair CW1308 or CAT5e	10 pair CW1308 or 12 core 0.5mm ² YY* ⁵	12 core 0.75mm ² YY* ⁵	not recommended	not recommended
Art.6256	6	4 pair CW1308 or CAT5e	10 pair CW1308 or 12 core 0.5mm ² YY* ⁵	12 core 0.75mm ² YY* ⁵	not recommended	not recommended

Whenever possible the speech line connections 1 and 2 should be twisted with the GND connection as pairs. The maximum acceptable resistance for power terminal connections and lock release connections = 3 Ohms or less, for all other connections = 10 Ohms or less for best possible performance. The Balanced video signal V1 and V2 should also be a twisted pair.

*⁵ Double up on the connections for power (+ and -) if using YY control cable. Also use cores 1, 2 and 3 for connections V1, V2 and GND respectively.



(More information regarding cabling can be found in the following Technical Manuals: VK4K, CVK4K 3600 Series, CVK4K 5000 Series, CVK4K 6056 Series, CVK4K 6256 Series, VK8K, CVK8K 3600 Series, CVK8K 5000 Series, CVK8K 6056 Series, CVK8K 6256 Series, VR4KV, CVR4KV 3600 Series, CVR4KV 5000 Series, CVR4KV 6056 Series and CVR4KV 6256 Series.

ESVK and CESVK Video Kits (VX2300 Video)

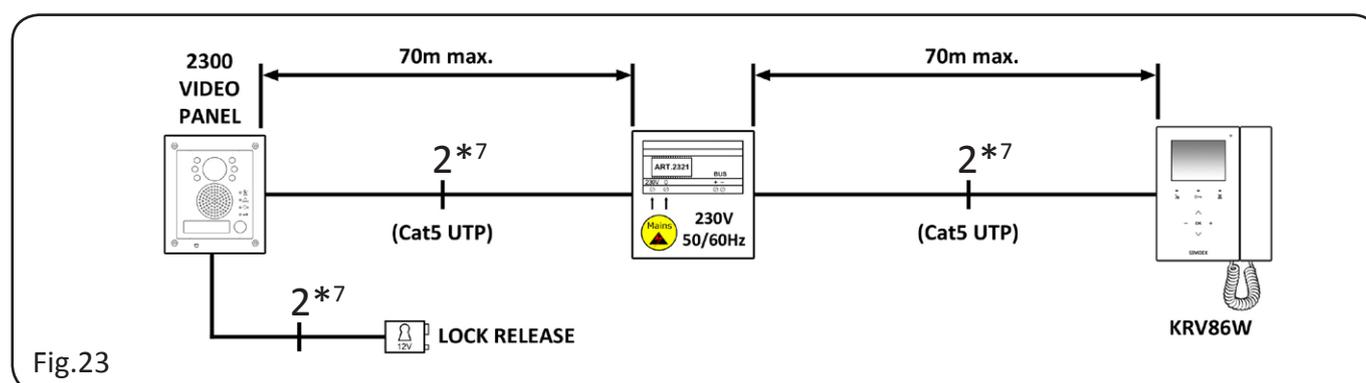
Both the ESVK and CESVK video kits are part of the VX2300 ‘true’ two wire digital system. It should be noted that the cable to be used must be unshielded cable and must be a twisted pair cable. Videx do not recommend using shielded or screened cable as this can cause high capacitance on the connections and interfere with the system operation. Only a single core out of the twisted pair should be used for each terminal connection.

Table J on below shows the minimum cable core requirements for the ESVK and CESVK video kits (*including the CESVKC Kristallo video kits*) using 3000 series, 3600 series, 5000 series handsfree eclipse monitors and Kristallo videophones. The number of cores required refers to the connections between the videophone inside and the location of the power supply.

Table J

Model	Min. Cores	* ⁶ Max. distance up to 70m	* ⁶ Max. distance up to 200m
Art.3381	2* ⁷	CAT5e (UTP) or CW1308 * ⁸ (AWG24, resistance ≤ 8 Ohms, capacitance ≤ 4.9 nF)	Videx CM2 (twisted pair cable) * ⁸ (AWG24, resistance ≤ 3.2 Ohms, capacitance ≤ 8 nF)
Art.3686	2* ⁷	CAT5e (UTP) or CW1308 * ⁸ (AWG24, resistance ≤ 8 Ohms, capacitance ≤ 4.9 nF)	Videx CM2 (twisted pair cable) * ⁸ (AWG24, resistance ≤ 3.2 Ohms, capacitance ≤ 8 nF)
Art.5488 or Art.SL5488	2* ⁷	CAT5e (UTP) or CW1308 * ⁸ (AWG24, resistance ≤ 8 Ohms, capacitance ≤ 4.9 nF)	Videx CM2 (twisted pair cable) * ⁸ (AWG24, resistance ≤ 3.2 Ohms, capacitance ≤ 8 nF)
Art.KRV86	2* ⁷	CAT5e (UTP) or CW1308 * ⁸ (AWG24, resistance ≤ 8 Ohms, capacitance ≤ 4.9 nF)	Videx CM2 (twisted pair cable) * ⁸ (AWG24, resistance ≤ 3.2 Ohms, capacitance ≤ 8 nF)
Art.KRV88	2* ⁷	CAT5e (UTP) or CW1308 * ⁸ (AWG24, resistance ≤ 8 Ohms, capacitance ≤ 4.9 nF)	Videx CM2 (twisted pair cable) * ⁸ (AWG24, resistance ≤ 3.2 Ohms, capacitance ≤ 8 nF)

The power supply for the ESVK and CESVK video kits should be located between the intercom panel outside and the videophone inside. Both the intercom panel and the videophones should cable directly back to the power supply as shown in Fig.23 below.



*⁶ The maximum distances shown are based on the distance between the outdoor intercom panel and the power supply and the distance between the power supply and the videophone. For example if a power supply was located at a central point then using a Cat5e UTP cable a videophone or Kristallo unit can be mounted up to 70m away in one direction in the building and an outdoor video intercom panel can be mounted up to 70m in the opposite direction giving an overall total cable distance from outdoor video intercom panel to the videophone inside the building of 140m.

*⁷ An additional cable core will be required if the door open LED (DOL) is connected.

*⁸ The resistance and capacitance values are based on 100m length of cable.

For larger VX2300 ‘true’ two wire video systems with multiple apartments and multiple doors the cable requirements shown in table J can be used as a guide.

(More information regarding cabling can be found in the following Technical Manual: 2 Wire Audio/Video Door Entry System Edition 2014 Rev 1.1.

TRADITIONAL VIDEO SYSTEMS

Non-Coax (*balanced*) Video Systems

The following tables show the cabling requirements for non-coax (*balanced*) video systems that use the Art.4838 and VX136 intelligent switching amplifiers. This includes 4K (*Art.4838*), VR4K (*VX136*) and VR120 (*VR136*) series video intercom panels.

Table K1 below shows the minimum number of cores required and the type of cable to use when installing 3000 series, 5000 series and 3600 series videophones. The distances shown in the table is the distance between the furthest video intercom panel and the furthest videophone.

Table K1

Model	Min. Cores	50m	100m	200m	300m	400m
Art.3312	10	6 pair CW1308	6 pair CW1308 or 12 core 0.5mm ² YY	15 pair CW1308 or 12 core 0.5mm ² YY	12 core 0.75mm ² YY	12 core 1.0mm ² YY
Art.3412	10	6 pair CW1308	6 pair CW1308 or 12 core 0.5mm ² YY	15 pair CW1308 or 12 core 0.5mm ² YY	12 core 0.75mm ² YY	12 core 1.0mm ² YY
Art.3313	12	10 pair CW1308	15 pair CW1308 or 12 core 0.5mm ² YY	15 pair CW1308 or 12 core 0.5mm ² YY	12 core 1.0mm ² YY	12 core 1.5mm ² YY
Art.3413	12	10 pair CW1308	15 pair CW1308 or 12 core 0.5mm ² YY	15 pair CW1308 or 12 core 0.5mm ² YY	12 core 1.0mm ² YY	12 core 1.5mm ² YY
Art.5412	10* ¹	10 pair CW1308	15 pair CW1308 or 12 core 0.5mm ² YY	15 pair CW1308 or 12 core 0.5mm ² YY	12 core 1.0mm ² YY	12 core 1.5mm ² YY
Art.SL5418	10* ¹	10 pair CW1308	15 pair CW1308 or 12 core 0.5mm ² YY	15 pair CW1308 or 12 core 0.5mm ² YY	12 core 1.0mm ² YY	12 core 1.5mm ² YY
Art.3612	10* ¹	10 pair CW1308	15 pair CW1308 or 12 core 0.5mm ² YY	15 pair CW1308 or 12 core 0.5mm ² YY	12 core 0.75mm ² YY	12 core 1.0mm ² YY
Art.3618	10* ¹	10 pair CW1308	15 pair CW1308 or 12 core 0.5mm ² YY	15 pair CW1308 or 12 core 0.5mm ² YY	12 core 1.0mm ² YY	12 core 1.5mm ² YY

**1 Additional cores will be required for the following connections: for the door open LED (DOL) 1 additional core, for a second camera recall option 1 additional core (only applicable if camera recall is required for a second video intercom panel, for a 3 door video system or more then the camera recall option is not available).*

Whenever possible between the videophones and the video switching equipment both speech line connections (*1 and 2*) should be twisted with the GND connection as pairs. The maximum acceptable resistance for power terminal connections and lock release connections = 3 Ohms or less, for all other connections = 10 Ohms or less for best possible performance. The balanced video signals V1 and V2 must be a twisted pair.

It is recommended that if YY cable is being used then use the numbered cores 1, 2 and 3 for the balanced video signal and VidGND connection (*e.g V1 = core 1, V2 = core 2 and VidGND = core 3*).

Table K2 (*see page 20*) shows the minimum number of cores required (*including the common connections*) for the number of videophones on the system (*up to 12 videophones*) and the cable type to use between the power supplies and video switching equipment and the video intercom panel.

Table K2

No. of Videophones	Min. No. of Cores	50m	100m	200m	300m	400m
1	13* ²	15 pair CW1308 or 12 core 0.5mm ² YY	2x7 core 0.5mm ² YY or 18 core 0.5mm ² YY	2x7 core 0.75mm ² YY or 18 core 0.75mm ² YY	2x7 core 1.0mm ² YY or 18 core 1.0mm ² YY	2x7 core 1.5mm ² YY or 18 core 1.5mm ² YY
2	14* ²	15 pair CW1308 or 12 core 0.5mm ² YY	2x7 core 0.5mm ² YY or 18 core 0.5mm ² YY	2x7 core 0.75mm ² YY or 18 core 0.75mm ² YY	2x7 core 1.0mm ² YY or 18 core 1.0mm ² YY	2x7 core 1.5mm ² YY or 18 core 1.5mm ² YY
3	15* ²	15 pair CW1308 or 12 core 0.5mm ² YY	18 core 0.5mm ² YY	18 core 0.75mm ² YY	18 core 1.0mm ² YY	18 core 1.5mm ² YY
4	16* ²	20 pair CW1308 or 18 core 0.5mm ² YY	18 core 0.5mm ² YY	18 core 0.75mm ² YY	18 core 1.0mm ² YY	18 core 1.5mm ² YY
5	17* ²	20 pair CW1308 or 18 core 0.5mm ² YY	18 core 0.5mm ² YY	18 core 0.75mm ² YY	18 core 1.0mm ² YY	18 core 1.5mm ² YY
6	18* ²	20 pair CW1308 or 18 core 0.5mm ² YY	18 core 0.5mm ² YY	18 core 0.75mm ² YY	18 core 1.0mm ² YY	18 core 1.5mm ² YY
7	19* ²	20 pair CW1308 or 2x12 core 0.5mm ² YY	2x12 core 0.5mm ² YY	2x12 core 0.75mm ² YY	2x12 core 1.0mm ² YY	2x12 core 1.5mm ² YY
8	20* ²	20 pair CW1308 or 2x12 core 0.5mm ² YY	2x12 core 0.5mm ² YY	2x12 core 0.75mm ² YY	2x12 core 1.0mm ² YY	2x12 core 1.5mm ² YY
9	21* ²	25 pair CW1308 or 2x12 core 0.5mm ² YY	2x12 core 0.5mm ² YY	2x12 core 0.75mm ² YY	2x12 core 1.0mm ² YY	2x12 core 1.5mm ² YY
10	22* ²	25 pair CW1308 or 2x12 core 0.5mm ² YY	2x12 core 0.5mm ² YY	2x12 core 0.75mm ² YY	2x12 core 1.0mm ² YY	2x12 core 1.5mm ² YY
11	23* ²	25 pair CW1308 or 2x12 core 0.5mm ² YY	2x12 core 0.5mm ² YY	2x12 core 0.75mm ² YY	2x12 core 1.0mm ² YY	2x12 core 1.5mm ² YY
12	24* ²	25 pair CW1308 or 2x12 core 0.5mm ² YY	2x12 core 0.5mm ² YY	2x12 core 0.75mm ² YY	2x12 core 1.0mm ² YY	2x12 core 1.5mm ² YY

*² Additional cores will be required for the following connections: trade facility 2 additional cores, coded keypad 2 additional cores. If fitting a fail safe lock then 2 additional cores and an appropriate DC power supply will be required.

Please note that if door monitoring is being used then a separate 2 core cable between the door monitoring contacts and the video switching equipment can be fitted. The maximum acceptable resistance for these connections = 3 Ohms or less for best possible performance. Table K3 below shows the type of cable that is recommended.

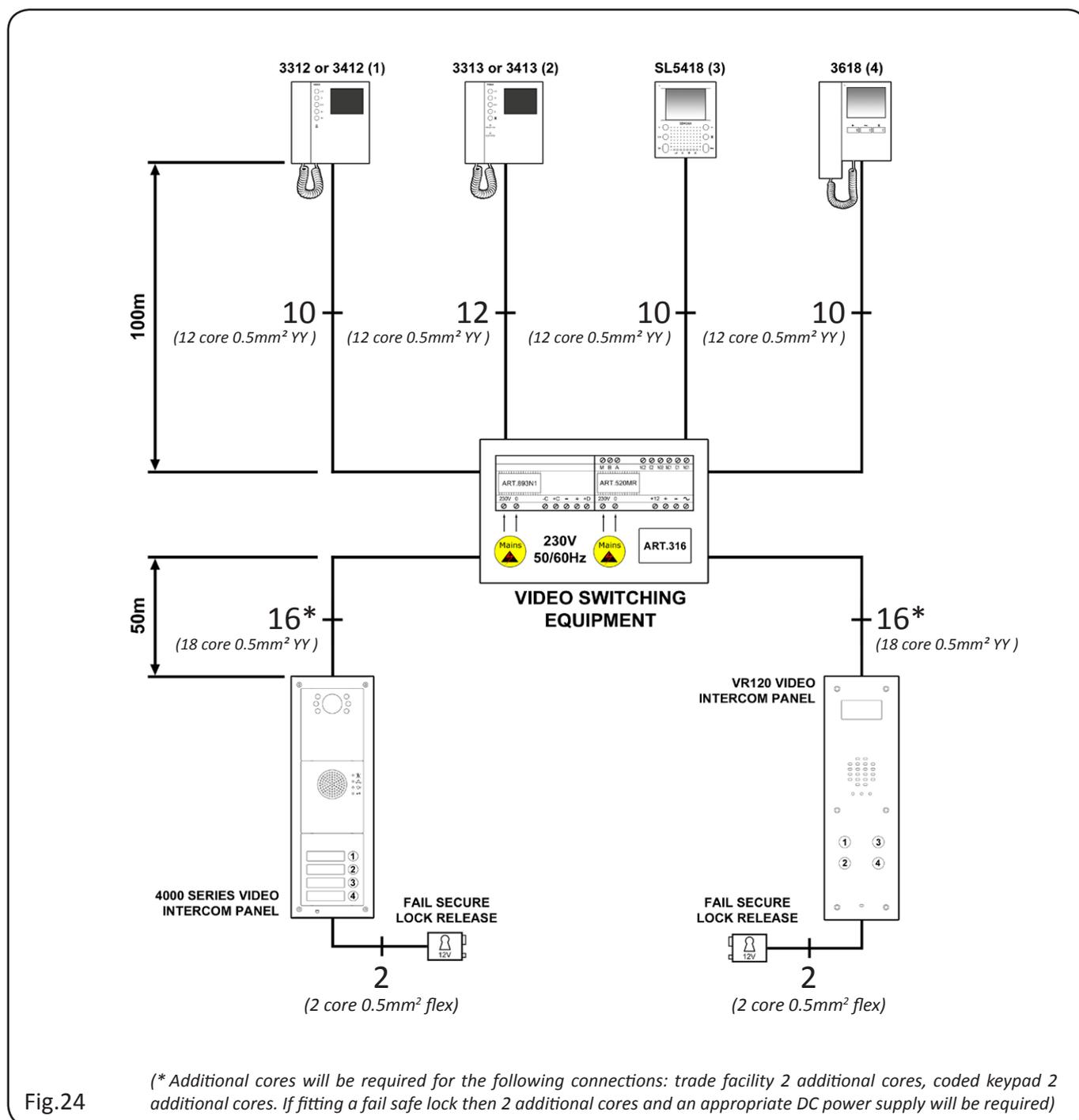
Table K3

Min. Cores	50m	100m	200m	300m	400m
2	2 core 0.5mm ² flex	2 core 1.0mm ² flex	2 core 1.5mm ² flex	2 core 2.0mm ² flex	2 core 2.5mm ² flex

Whenever possible between the video switching equipment and the video intercom panel both the videophone speech line connections (1 and 2) should be twisted with the GND connection as pairs. The maximum acceptable resistance for power terminal connections and lock release connections = 3 Ohms or less, for all other connections = 10 Ohms or less for best possible performance. The balanced video signals V1 and V2 must be a twisted pair.

It is recommended that if YY cable is being used then use the numbered cores 1, 2 and 3 for the balanced video signal and VidGND connection (e.g V1 = core 1, V2 = core 2 and VidGND = core 3).

The previous tables K1, K2 and K3 can be used to build up a cable layout for a non-coax video system. The videophones should be cabled back to a central point where the video switching equipment would be located (including any Art.316 non-coax video distributors). The video intercom door station would also cable back to the central point. Fig.24 shows an example of a 2 entrance 4 button video intercom system using 3000 series, 5000 series and 3600 series videophones with an overall distance of 150m from intercom door station to the videophones.



Coax Video Systems

The videophones shown in table K1 can also be used with the same intelligent switching amplifiers (Art.4838 and VX136) to make up a coax video system if a balanced video system is not required. Table L1 below shows the type of coax cable to use and the distance shown is the overall distance between the furthest video intercom panel and the furthest videophone.

Table L1

50m	100m	200m	300m	400m
RG59 (BC) internal	RG59 (BC) internal	RG59 (BC) internal	RG11 (BC) internal	RG11 (BC) internal
CT100 (BC) external	CT100 (BC) external	CT100 (BC) external	CT125 (BC) external	CT125 (BC) external

Table L2 below shows the minimum number of cores required, the type of cable to use and which coax cable to use when installing 3000 series, 5000 series and 3600 series videophones. The distances shown in the table is the distance between the furthest video intercom panel and the furthest videophone.

Table L2

Model	Min. Cores	50m	100m	200m	300m	400m
Art.3312	9 + coax	6 pair CW1308 + RG59 (BC)	6 pair CW1308 or 12 core 0.5mm ² YY + RG59 (BC)	15 pair CW1308 or 12 core 0.5mm ² YY + RG59 (BC)	12 core 0.75mm ² YY + RG11 (BC)	12 core 1.0mm ² YY + RG11 (BC)
Art.3412	9 + coax	6 pair CW1308 + RG59 (BC)	6 pair CW1308 or 12 core 0.5mm ² YY + RG59 (BC)	15 pair CW1308 or 12 core 0.5mm ² YY + RG59 (BC)	12 core 0.75mm ² YY + RG11 (BC)	12 core 1.0mm ² YY + RG11 (BC)
Art.3313	11* ¹ + coax	10 pair CW1308 + RG59 (BC)	12 pair CW1308 or 12 core 0.5mm ² YY + RG59 (BC)	15 pair CW1308 or 12 core 0.5mm ² YY + RG59 (BC)	12 core 1.0mm ² YY + RG11 (BC)	12 core 1.5mm ² YY + RG11 (BC)
Art.3413	11* ¹ + coax	10 pair CW1308 + RG59 (BC)	12 pair CW1308 or 12 core 0.5mm ² YY + RG59 (BC)	15 pair CW1308 or 12 core 0.5mm ² YY + RG59 (BC)	12 core 1.0mm ² YY + RG11 (BC)	12 core 1.5mm ² YY + RG11 (BC)
Art.5412	10* ¹ + coax	10 pair CW1308 + RG59 (BC)	12 pair CW1308 or 12 core 0.5mm ² YY + RG59 (BC)	15 pair CW1308 or 12 core 0.5mm ² YY + RG59 (BC)	12 core 1.0mm ² YY + RG11 (BC)	12 core 1.5mm ² YY + RG11 (BC)
Art.SL5418	10* ¹ + coax	10 pair CW1308 + RG59 (BC)	12 pair CW1308 or 12 core 0.5mm ² YY + RG59 (BC)	15 pair CW1308 or 12 core 0.5mm ² YY + RG59 (BC)	12 core 1.0mm ² YY + RG11 (BC)	12 core 1.5mm ² YY + RG11 (BC)
Art.3612	9* ¹ + coax	6 pair CW1308 + RG59 (BC)	6 pair CW1308 or 12 core 0.5mm ² YY + RG59 (BC)	15 pair CW1308 or 12 core 0.5mm ² YY + RG59 (BC)	12 core 0.75mm ² YY + RG11 (BC)	12 core 1.0mm ² YY + RG11 (BC)
Art.3618	10* ¹ + coax	10 pair CW1308 + RG59 (BC)	12 pair CW1308 or 12 core 0.5mm ² YY + RG59 (BC)	15 pair CW1308 or 12 core 0.5mm ² YY + RG59 (BC)	12 core 1.0mm ² YY + RG11 (BC)	12 core 1.5mm ² YY + RG11 (BC)

*¹ Additional cores will be required for the following connections: for the door open LED (DOL) 1 additional core, for a second camera recall option 1 additional core (only applicable if camera recall is required for a second video intercom panel, for a 3 door video system or more then the camera recall option is not available).

Whenever possible between the videophones and the video switching equipment both speech line connections (1 and 2) should be twisted with the GND connection as pairs. The maximum acceptable resistance for power terminal connections and lock release connections = 3 Ohms or less, for all other connections = 10 Ohms or less for best possible performance.

Table L3 (see page 23) shows the minimum number of cores required (including the common connections) for the number of videophones on the system (up to 12 videophones) and the cable type to use between the power supplies, video switching equipment and the video intercom panel.



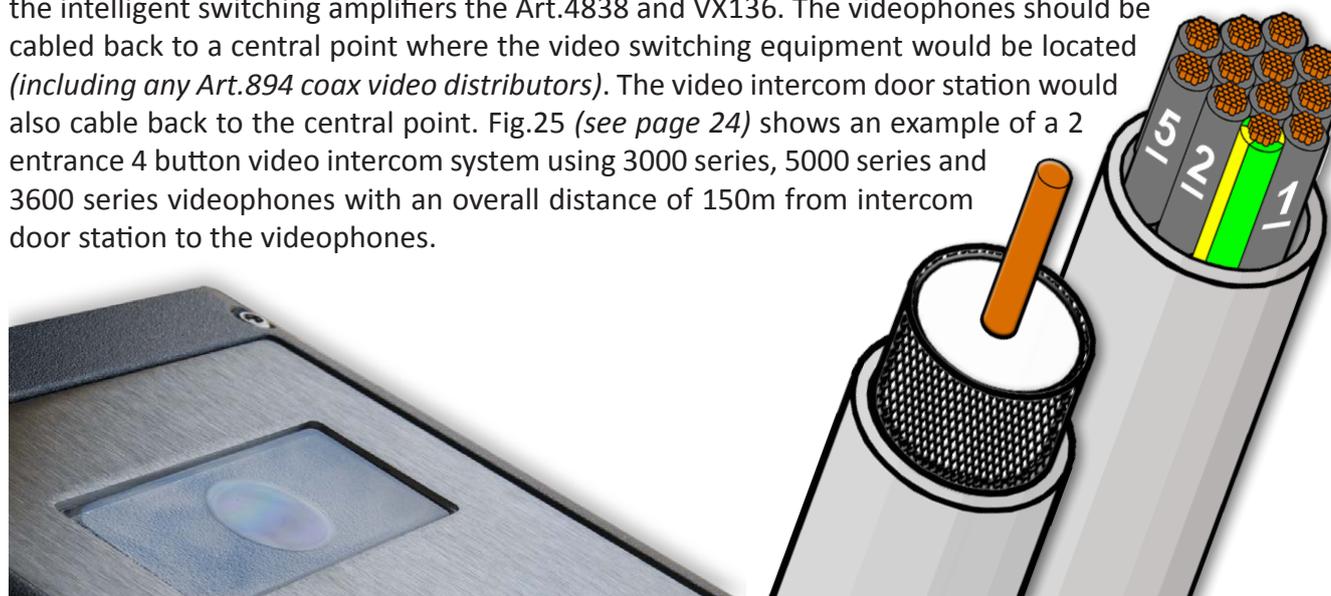
Table L3

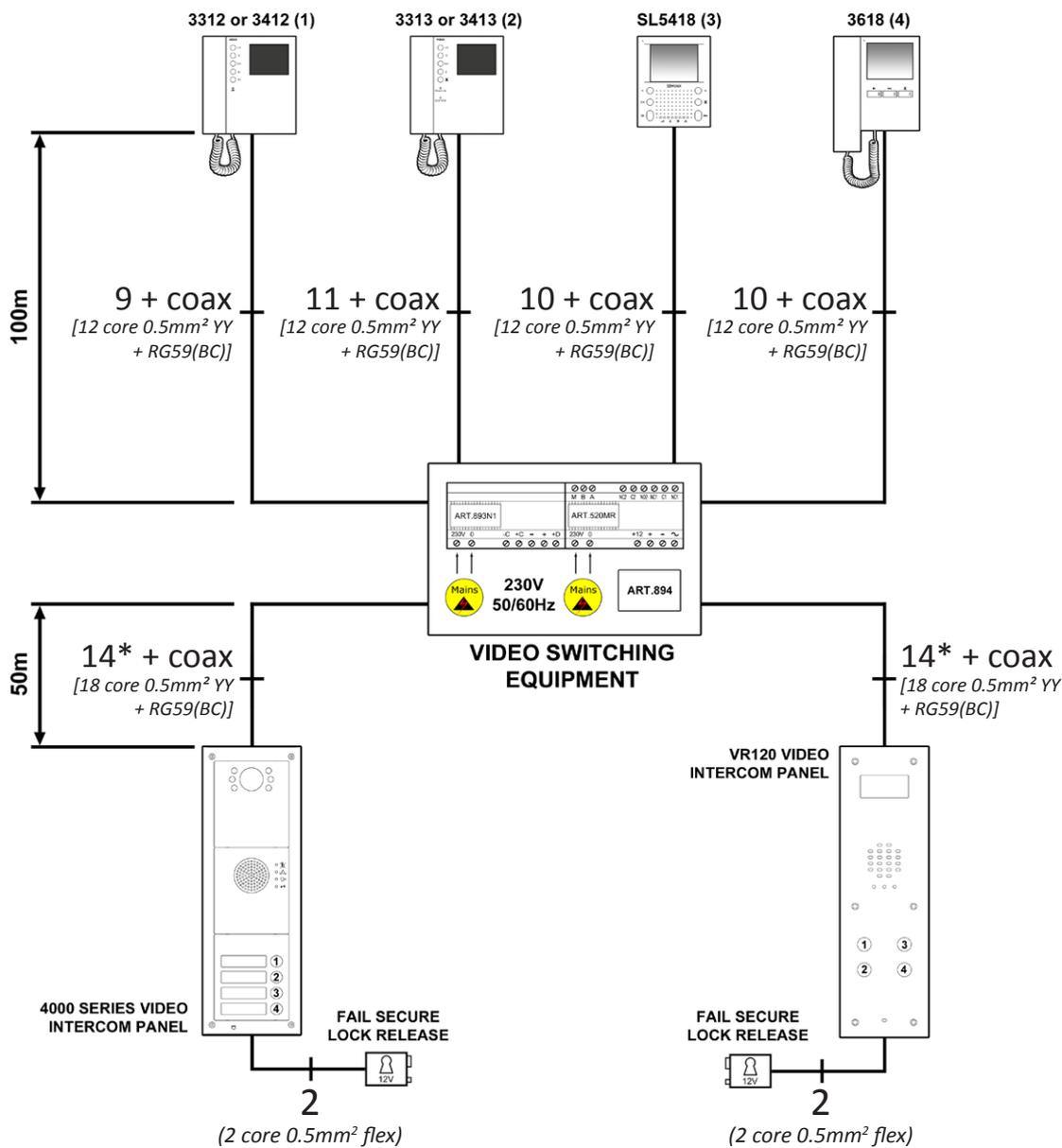
No. of Videophones	Min. No. of Cores	50m	100m	200m	300m	400m
1	11* ²	15 pair CW1308 or 12 core 0.5mm ² YY	12 core 0.5mm ² YY	12 core 0.75mm ² YY	12 core 1.0mm ² YY	12 core 1.5mm ² YY
2	12* ²	15 pair CW1308 or 12 core 0.5mm ² YY	12 core 0.5mm ² YY	12 core 0.75mm ² YY	12 core 1.0mm ² YY	12 core 1.5mm ² YY
3	13* ²	15 pair CW1308 or 18 core 0.5mm ² YY	18 core 0.5mm ² YY	18 core 0.75mm ² YY	18 core 1.0mm ² YY	18 core 1.5mm ² YY
4	14* ²	15 pair CW1308 or 18 core 0.5mm ² YY	18 core 0.5mm ² YY	18 core 0.75mm ² YY	18 core 1.0mm ² YY	18 core 1.5mm ² YY
5	15* ²	15 pair CW1308 or 18 core 0.5mm ² YY	18 core 0.5mm ² YY	18 core 0.75mm ² YY	18 core 1.0mm ² YY	18 core 1.5mm ² YY
6	16* ²	20 pair CW1308 or 18 core 0.5mm ² YY	18 core 0.5mm ² YY	18 core 0.75mm ² YY	18 core 1.0mm ² YY	18 core 1.5mm ² YY
7	17* ²	20 pair CW1308 or 18 core 0.5mm ² YY	18 core 0.5mm ² YY	18 core 0.75mm ² YY	18 core 1.0mm ² YY	18 core 1.5mm ² YY
8	18* ²	20 pair CW1308 or 18 core 0.5mm ² YY	18 core 0.5mm ² YY	18 core 0.75mm ² YY	18 core 1.0mm ² YY	18 core 1.5mm ² YY
9	19* ²	20 pair CW1308 or 2x12 core 0.5mm ² YY	2x12 core 0.5mm ² YY	2x12 core 0.75mm ² YY	2x12 core 1.0mm ² YY	2x12 core 1.5mm ² YY
10	20* ²	20 pair CW1308 or 2x12 core 0.5mm ² YY	2x12 core 0.5mm ² YY	2x12 core 0.75mm ² YY	2x12 core 1.0mm ² YY	2x12 core 1.5mm ² YY
11	21* ²	20 pair CW1308 or 2x12 core 0.5mm ² YY	2x12 core 0.5mm ² YY	2x12 core 0.75mm ² YY	2x12 core 1.0mm ² YY	2x12 core 1.5mm ² YY
12	22* ²	25 pair CW1308 or 2x12 core 0.5mm ² YY	2x12 core 0.5mm ² YY	2x12 core 0.75mm ² YY	2x12 core 1.0mm ² YY	2x12 core 1.5mm ² YY

*² Additional cores will be required for the following connections: trade facility 2 additional cores, coded keypad 2 additional cores. If fitting a fail safe lock then 2 additional cores and an appropriate DC power supply will be required. For door monitoring refer to table K3 on page 20.

Whenever possible between the video switching equipment and the video intercom panel both speech line connections (1 and 2) should be twisted with the GND connection as pairs. The maximum acceptable resistance for power terminal connections and lock release connections = 3 Ohms or less, for all other connections = 10 Ohms or less for best possible performance.

The centre core of the coax is the signal connection V and the screen of the coax is the GND connection M. The previous tables L1, L2 and L3 can be used to build up a cable layout for a coax video system using the intelligent switching amplifiers the Art.4838 and VX136. The videophones should be cabled back to a central point where the video switching equipment would be located (including any Art.894 coax video distributors). The video intercom door station would also cable back to the central point. Fig.25 (see page 24) shows an example of a 2 entrance 4 button video intercom system using 3000 series, 5000 series and 3600 series videophones with an overall distance of 150m from intercom door station to the videophones.





(* Additional cores will be required for the following connections: trade facility 2 additional cores, coded keypad 2 additional cores. If fitting a fail safe lock then 2 additional cores and an appropriate DC power supply will be required)

Fig.25

DIGITAL VX2200 VIDEO SYSTEM

The VX2200 digital video system uses a 2 core databus connection (*L and -*) and additional video connections (*+20V, VidGND, V1, V2 and depending on videophone used +12V*). For the L and - databus connections and also for the balanced video signal V1 and V2 a twisted pair cable should be used the maximum acceptable resistance for these connections should be 7.5 Ohms or less. For the power connections +20V, VidGND and +12V the maximum acceptable resistance should be no greater than 5 Ohms.

Doubling up on core connections to increase the CSA of the connection and reduce the overall resistance is acceptable, however it should be noted that wherever possible no more than 2 cores per connection should be used as this can cause an increase in capacitance of the cable which can affect the databus operation. It is also recommended to avoid doubling up on the balanced video pair V1 and V2 as this can also be affected by increased capacitance.

Digital System (VX2200) Videophones, Handsfree Eclipse and Kristallo

Table M (*below*) shows the minimum number of cores required for the following videophones; 3600 series, 5000 series handsfree eclipse (*including VR*), 6000 series, 6200 series and Kristallo touch sensitive videophones for the VX2200 digital system.

The recommended way to cable the connections for this system is in a 'star' configuration as it uses a common bus connection. For example for a single entrance video intercom door station calling multiple flats in a block with multiple floors we would recommend that the video intercom door station is cabled back to a central point in the main riser cupboard where the control equipment is located. A common bus connection including video connections (*+20V, VidGND, V1, V2 and +12V*) can then be fed up the riser to a local junction point in a riser cupboard on the first floor and then fed again up the riser through to a local junction point on the second floor and so on. The databus and video connections can then be 'star' wired from the local junction point to each videophone on that floor. Any video distribution boxes and additional power supplies can be located in the local junction points on each floor where required. An example of the cabling over a total distance of 200m can be seen in Fig.26 (*see page 26*).

Table M

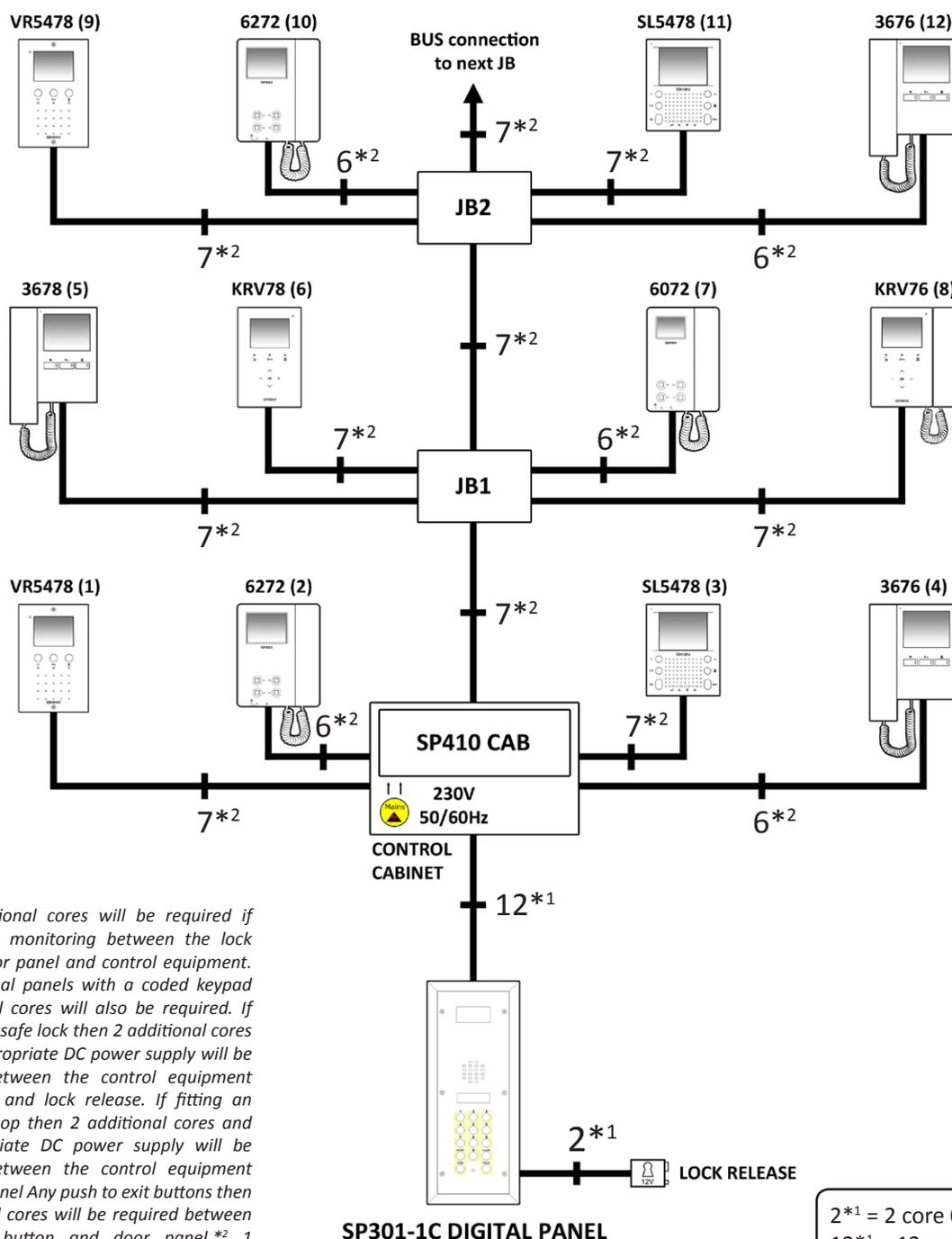
Model	Min. Cores	50m	100m	200m	300m	400m
Art.3676*	6	4 pair CW1308 or 7 core 0.5mm ² YY	6 pair CW1308 or 12 core 0.5mm ² YY	10 pair CW1308 or 12 core 0.5mm ² YY	12 core 0.75mm ² YY	12 core 1.0mm ² YY
Art.3678*	7	6 pair CW1308 or 7 core 0.5mm ² YY	10 pair CW1308 or 12 core 0.5mm ² YY	12 core 0.5mm ² YY	12 core 0.75mm ² YY	12 core 1.0mm ² YY
Art.SL5478*	7	6 pair CW1308 or 7 core 0.5mm ² YY	10 pair CW1308 or 12 core 0.5mm ² YY	12 core 0.5mm ² YY	12 core 0.75mm ² YY	12 core 1.0mm ² YY
VR5478*	7	6 pair CW1308 or 7 core 0.5mm ² YY	10 pair CW1308 or 12 core 0.5mm ² YY	12 core 0.5mm ² YY	12 core 0.75mm ² YY	12 core 1.0mm ² YY
Art.6072*	6	4 pair CW1308 or 7 core 0.5mm ² YY	6 pair CW1308 or 12 core 0.5mm ² YY	10 pair CW1308 or 12 core 0.5mm ² YY	12 core 0.75mm ² YY	12 core 1.0mm ² YY
Art.6272*	6	4 pair CW1308 or 7 core 0.5mm ² YY	6 pair CW1308 or 12 core 0.5mm ² YY	10 pair CW1308 or 12 core 0.5mm ² YY	12 core 0.75mm ² YY	12 core 1.0mm ² YY
KRV76*	7	6 pair CW1308 or 7 core 0.5mm ² YY	10 pair CW1308 or 12 core 0.5mm ² YY	12 core 0.5mm ² YY	12 core 0.75mm ² YY	12 core 1.0mm ² YY
KRV78*	7	6 pair CW1308 or 7 core 0.5mm ² YY	10 pair CW1308 or 12 core 0.5mm ² YY	12 core 0.5mm ² YY	12 core 0.75mm ² YY	12 core 1.0mm ² YY

(Please note if using the older style 3000 series videophones the Art.3371 or Art.3471 follow the cable specification for the Art.3676. If using the older style 3000 series videophones the Art.3376 or 3476 then follow the cable specification for the Art.3676).

* If door monitoring is being used then an additional core will be required for the door open LED (DOL).

It is recommended that if YY cable is being used then use the numbered cores 1, 2 and 3 for the balanced video signal and VidGND connection (e.g V1 = core 1, V2 = core 2 and VidGND = core 3).

Fig.26



(*1 2 additional cores will be required if fitting door monitoring between the lock release, door panel and control equipment. On functional panels with a coded keypad 2 additional cores will also be required. If fitting a fail safe lock then 2 additional cores and an appropriate DC power supply will be required between the control equipment door panel and lock release. If fitting an induction loop then 2 additional cores and an appropriate DC power supply will be required between the control equipment and door panel Any push to exit buttons then 2 additional cores will be required between the wPTE button and door panel.*2 1 additional core will be required if fitting door monitoring between the control equipment, junction point and videophones).

2*1 = 2 core 0.5mm² flex.
 12*1 = 12 core 1.0mm² YY.
 6*2 = 12 core 0.5mm² YY.
 7*2 = 12 core 0.5mm² YY.

IMPORTANT NOTE: Please be aware that when selecting a cable for the VX2200 digital system then the following should **NOT** be used: Copper Coated Steel (CCS) and Copper Clad Aluminium (CCA). While these types of cable may offer a low cost solution they will have a higher resistance than a pure copper cable and can affect the overall performance of the digital system therefore Videx **DO NOT** recommend these types of cable.

Guidelines to Overcome Extreme Electromagnetic Interference (EMI)

In situations of EMI where interference is affecting the functions and performance of the system it is advised to add a ferrite ring. The following guide shows how to do this.

For Mains Cable

Loop the mains cable twice through the ferrite core (*Model No. RT310-190-160 or equivalent*) see Fig.27A below.

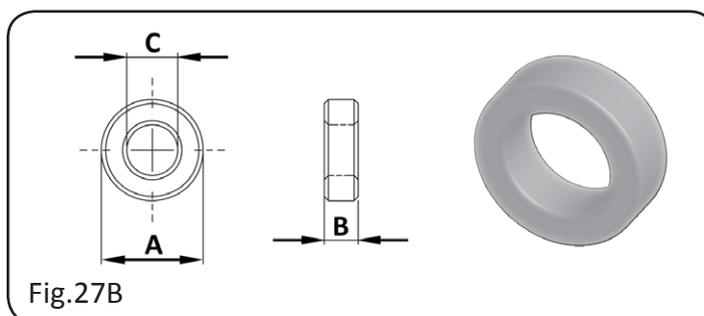
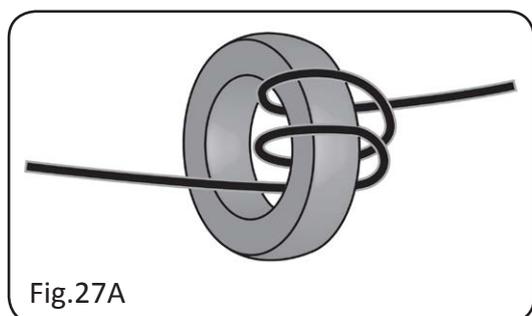


Table N1 below shows the properties for the ferrite core model no. RT310-190-160 and Fig.27B above shows the dimensions of the ferrite core. If an equivalent ferrite core is used then it must have similar dimensions and must have the same properties as shown in Table N1.

Table N1

FERRITE MATERIAL: K5B						
Model No.	Dimensions (mm)			Impedance (Ohms)		Standard Pack
	A	B	C	25MHz	100MHz	
RT310-190-160-K5B	31.00	16.00	19.00	68	115	40

For the Videophone Cable

Loop the databus cable which connects the video distributor to the videophone twice through the ferrite core (*Model No. RKCF-13-A5 or equivalent*) as shown in Fig.27A.

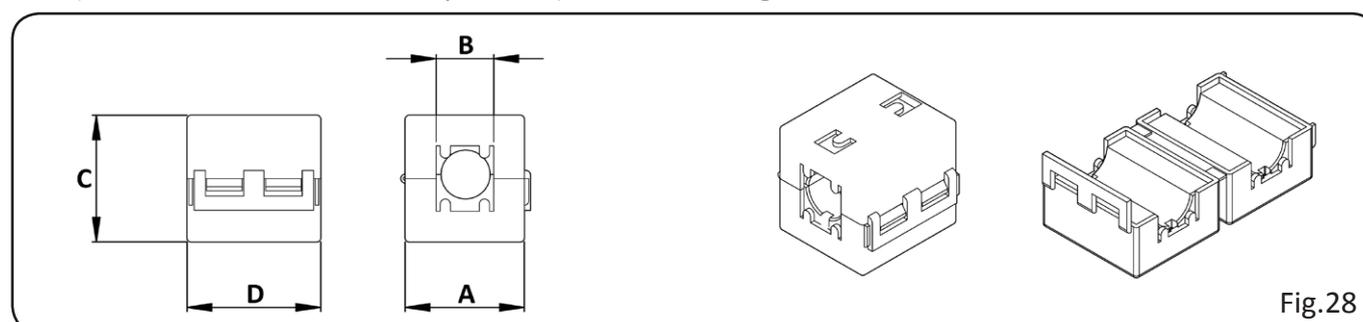


Table N2 below shows the properties for the ferrite core model no. RKCF-13-A5 and Fig.28 above shows the dimensions of the ferrite core. If an equivalent ferrite core is used then it must have similar dimensions and must have the same properties as shown in Table N2.

Table N2

FERRITE MATERIAL: A								
Model No.	Dimensions (mm) +/- 1.00				Impedance (Ohms)		Applicable cable max. dia.	Standard Pack
	A	B	C	D	25MHz	100MHz		
RKCF-13-A5	31.50	14.00	31.50	32.50	150	250	13	32

The cable requirements shown for the VX2200 videophones, handsfree Eclipse and Kristallo units in the previous table advise using CW1308 and YY control cable, however it is perfectly acceptable to use equivalent cable types if any of these cables cannot be sourced providing they meet the cable characteristics

of those described on pages 3 - 5.

(More information regarding system setup cabling can be found in the following Technical Manuals: VX2200 Digital System Technical Manual Edition 2014 Version 1.0 and VX2200 Block Diagram Manual Edition 1.2).

DIGITAL VX2300 VIDEO SYSTEM

The cable requirements for the VX2300 'true' two wire video digital system can be found on pages 18 and 19. More cable information can also be found in the following Technical Manual: 2 Wire Audio/Video Door Entry System Edition 2014 Rev 1.1.



PROXIMITY ACCESS CONTROL

VProx Proximity Access Control (VP20, VP100, VP250)

The cabling for the VProx series of proximity access control all require a minimum of 5 cores (+12V, GND, RK, LR and LG) between the Vprox reader and the main Vprox control unit with the exception of the standalone Vprox readers the Art.4850 and Art.4850/P which only require 2 connections for power and additional wiring for Push to exit switches and lock release.

Table O below shows the minimum cable requirements for the full range of Vprox readers available and the maximum distance the Vprox reader can be located from the main VProx control unit. Ideally the VProx reader should be as close to the main control unit as possible, however it can be placed upto a maximum of 50m away providing the cable meets the requirements as shown in Table O below. An example is shown in Fig.29. For power supply, lock release and push to exit connections refer to page 6 and 7.

Table O

Vprox Reader	50m
VP/PM	4 pair CW1308 or 7 core 0.5mm ² YY
8849	
849PG	
849PW	
849ZG	
849ZN	
849FS	
849SS	
4849	

For best performance the RK and GND connections should be a twisted pair. If using YY control cable then use the numbered cores 1, 2 and 3 for +12V, GND and RK connections (e.g +12V = core 1, GND = core 2 and RK = core 3). The maximum acceptable resistance for all terminal connections = 10 Ohms or less for best possible performance.

Please note that it is acceptable to double up on the core connections for power (+12V and GND) in order to overcome voltage drop issues, however the RK data connection should only be connected using a single core. Any more cores used for this connection can cause capacitance issues with the data.

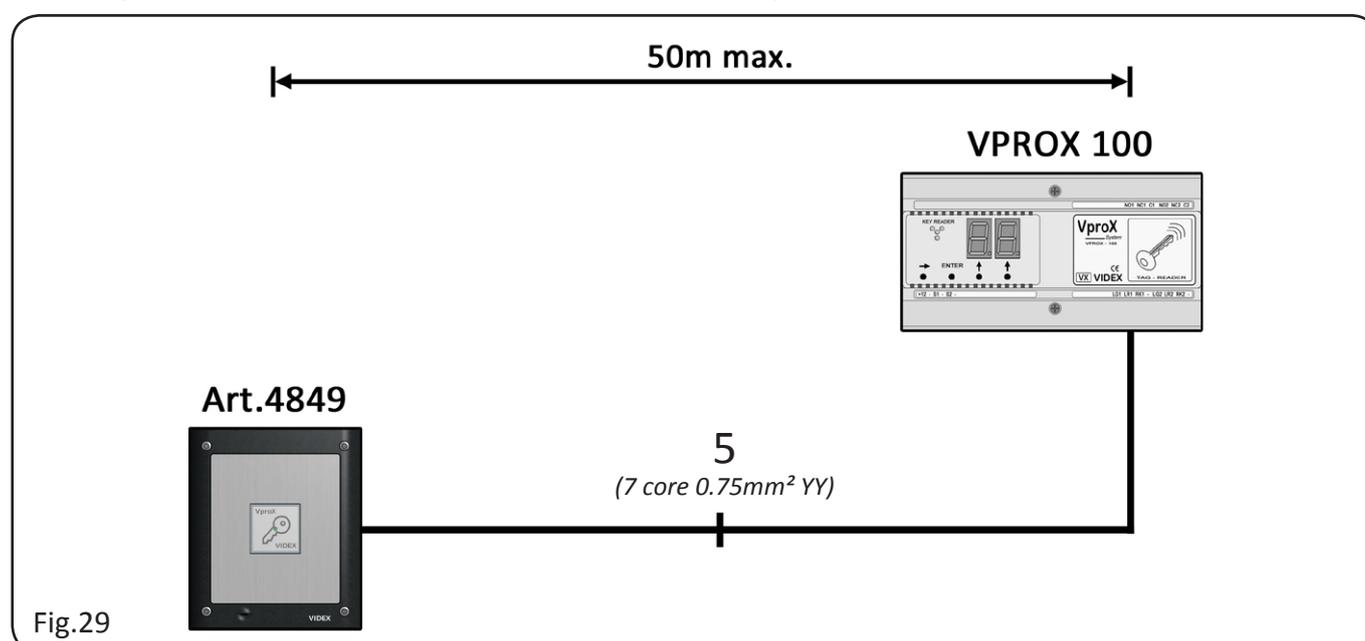


Fig.29

Shadow Proximity Controller (SC24000)

The cabling for the SC24000 shadow proximity controller requires a minimum of 6 cores (+12V, GND, D0, D1, LR- and LG-) per reader and can be mounted up to a maximum of 50m away from the controller. The SC24000 controller is compatible with the following range of XPR proximity readers: the MTPX-M range, VPROX2, 4849PP, VR4KPPM and the XPROX vandal resistant panel mount reader. Additional cores will be required for the power input connections, lock release, door monitoring and push to exit buttons.

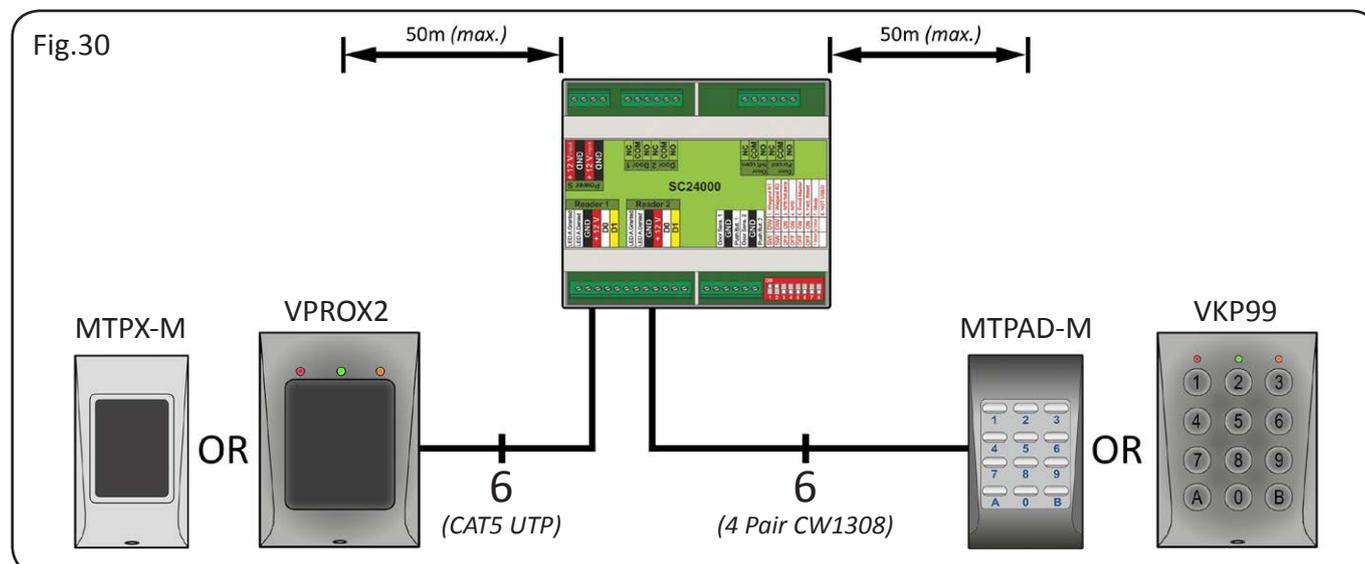
In addition to connecting proximity readers the SC24000 controller can also have the following coded keypads connected: LCSP range, VKP99, INOX99 and the MTPAD-M range of keypads. Like the proximity readers all types of keypad only require 6 cores connected between the keypad and the SC24000 controller and should be mounted no more than 50m away from the controller. As the individual connections for each keypad is different please consult the SC24000 Proximity Technical Manual for keypad wiring and the specific keypad technical instructions for the keypad setup. Table P below shows the cable types that can be used with the SC24000 controller. For power supply, lock release and push to exit connections refer to page 6 and 7.

Table P

Reader	50m (max.)		
MTPX-M (full range)	8 core alarm cable	4 Pair CW1308	CAT5 (UTP)
VPROX2			
4849PP			
VR4KPPM			
XPROX			
Keypad	50m (max.)		
MTPAD-M (full range)	8 core alarm cable	4 Pair CW1308	CAT5 (UTP)
LCSP (full range)			
VKP99			
INOX99			

Please note that it is acceptable to double up on the core connections for power (+12V and GND) in order to overcome voltage drop issues. The data connections D0 and D1 should only have single core connections. Whichever cable is used please ensure that they are solid core copper and **NOT** CCS or CCA equivalents (as described on page 4).

An example of the cable connections is shown in Fig.30 below.



Portal Plus Proximity and Bio Access Control

Proximity Readers

The cabling for the Portal Plus controllers the EWS and EWSi requires a minimum of 6 cores (+12V, GND, D0, D1, LR- and LG-) for each proximity reader and can be mounted up to a maximum of 50m away from the controller. The EWS and EWSi controllers are compatible with the complete range of XPR proximity readers: the MTPX-M range (*including the DINMTPX-M flush range*), MINI-M, VPROX2, 4849PP, VR4KPPM, XPROX vandal resistant panel mount reader and the MTPX-MF mifare readers (*including the MINI-MF mifare reader*).

It should be noted that the EWS and EWSi controllers will already be housed in either a PPCU1 or PPCU2 control cabinet and therefore connections for power will be pre-wired, however if the controllers are not mounted inside a pre-wired cabinet then 2 additional cores will be required for the power. In this case refer to pages 6 and 7 for these connections, also additional cores will be required for lock release, door monitoring and push to exit buttons.

Table Q1 below shows the cable type that can be used and the maximum distance the proximity reader can be located from the EWS and EWSi controller.

Table Q1

Reader	50m (max.)		
MTPX-M (full range)	8 core alarm cable	4 Pair CW1308	CAT5 (UTP)
DINMTPX-M (full range)			
MINI-M			
VPROX2			
4849PP			
VR4KPPM			
XPROX			
MTPX-MF			
MINI-MF			

Keypads

The Portal Plus controllers can also have the following range of keypads connected to them: the MTPAD-M range and the DINPAD-M (*flush*) range. The keypads like the proximity readers only require a minimum of 6 cores (+12V, GND, D0, D1, LR- and LG-) between the controller and the keypad. Table Q2 below shows the cable type and the maximum distance that they can be located from the controller.

Table Q2

Reader	50m (max.)		
MTPX-M (full range)	8 core alarm cable	4 Pair CW1308	CAT5 (UTP)
DINMTPX-M (full range)			
MINI-M			
VPROX2			
4849PP			
VR4KPPM			
XPROX			
MTPX-MF			
MINI-MF			

Bio Access Readers

In addition to proximity readers and keypads the Portal Plus controllers can also have Bio Access readers connected to them. The Bio Access readers require a minimum of 4 cores plus an RS485 connection. There are two methods of connecting a Bio Access reader to an EWS and EWSi controller. The primary method is to connect the RS485 cable (*using a shielded twisted pair RS485 or equivalent*) in a 'daisy chain' arrangement with any other RS485 devices on the bus, this means that there would be an incoming and outgoing RS485 connection to each Bio Access reader (*up to a maximum of 50m away from the controller*) an example of this method is shown in Fig.31. However if the distance of the Bio Access reader is less than 3m away from the controller then it is possible to 'branch' off the RS485 bus, as shown in Fig.32.

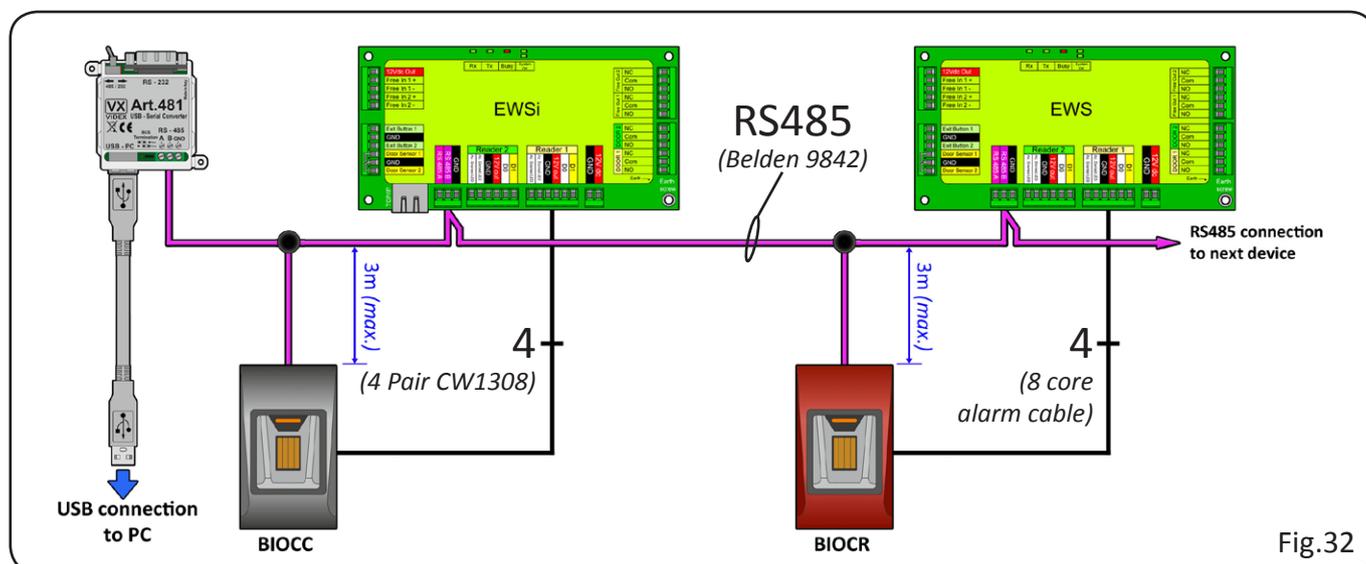
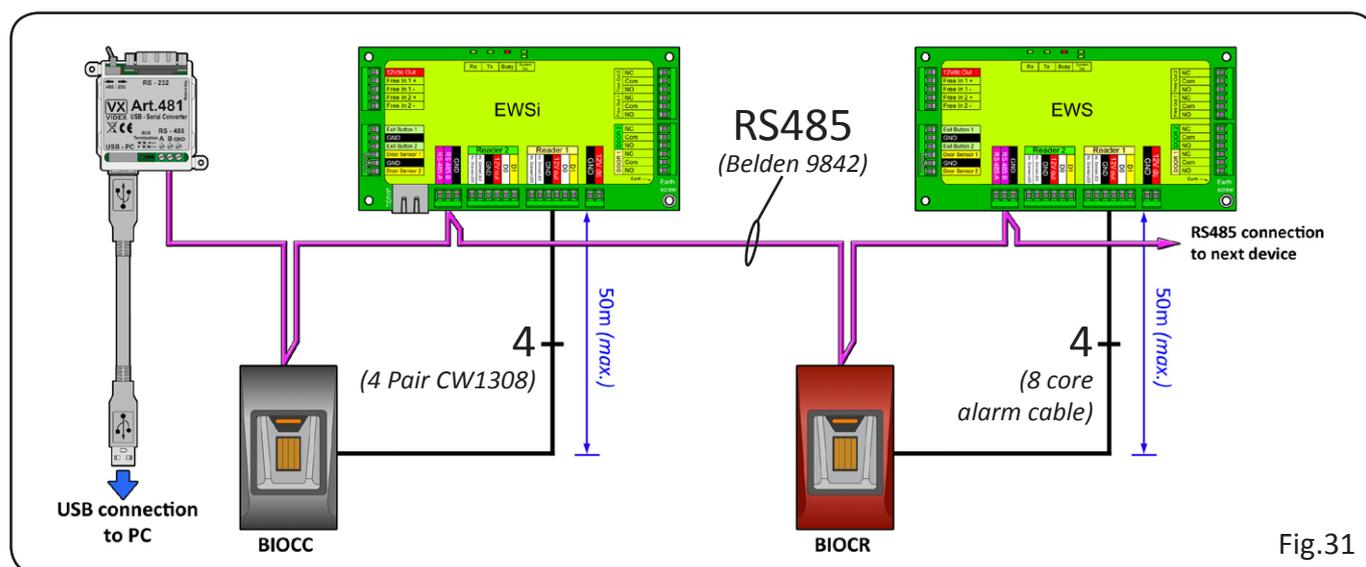


Table R1 below shows the recommended RS485 cable type to use.

Table R1

Belden 9842 (Paired - Low Capacitance EIA RS-485)					
AWG	No. of Pairs	Conductor DC Resistance @ 20°C	Nominal Capacitance Conductor to Conductor @ 1KHz	Max. Current (per conductor)	Operating Temp. Range (°C)
24	2	24 Ohms/ft	12.8 pF/ft	2.1A @ 25°C	-30°C to +80°C

Belden 9842 RS485 cable is constructed using tinned copper conductors with a polyethylene insulation.

The pairs are twisted with an overall aluminium/polyester foil screen including a tinned copper drain wire (24AWG). The outer screen is a tinned copper braid.

It should be noted that if a Belden 9842 RS485 cable cannot be directly sourced then an equivalent RS485 cable can be used providing that it meets the cable characteristics of the RS485 cable shown in table R1 and has the same properties as described on pages 32 and 33.

Table R2 below shows the cable type recommended for the 4 core connections for the Bio access readers.

Table R2

Reader	50m (max.)		
BIOC (full range)	8 core alarm cable	4 Pair CW1308	CAT5 (UTP)

More information regarding cabling, proximity programming, keypad programming and setup can be found in the following Technical Manuals:

For the VProx systems -

VP20 Proximity Access Control System, VP100 Proximity Access Control Technical Manual Edition 1.2 (04/02/2011, code: 66250650), VP250 Proximity Access Control Ver.1.1.

For the Standalone VProx systems -

The Art.4850 refer to Technical Manual Art.4850 Standalone Proximity Rev.1.1 and for the Art.4850/P refer to the Technical Manual Art.4850/P Standalone Proximity Rev.1.3.

For the Shadow Proximity Controller SC24000 -
SC24000 Programming and Technical Manual.

For the Programmable Keypads -

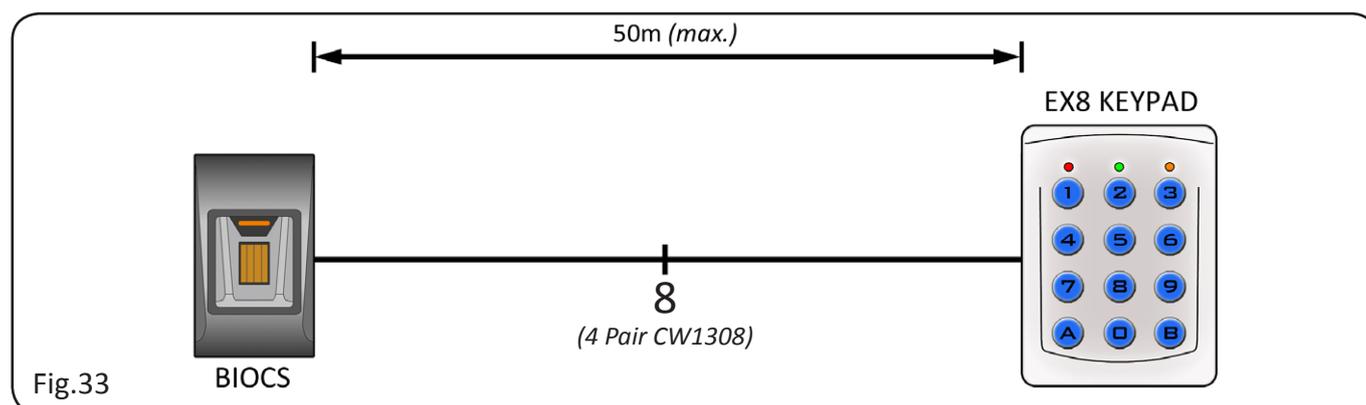
MTPAD-M range refer to the MTPAD-M Programming and Technical Manual, LCSP Settings for EWS Technical Sheet, VKP99 Technical Manual, INOX99 Technical Manual.

For the Portal Plus Proximity Systems -

Portal Plus Installation Manual Version 1.4.

FPK1 Bio Access Kit

The FPK1 Bio Access Kit comes with a 12Vdc switch mode power supply, EX8 control keypad and a BIOC bio-metric fingerprint reader. The power supply should be mounted as close as possible to the EX8 controller up to a maximum of 20m. If longer distances are unavoidable for the power supply then it is recommended that a screened cable is used and ensure that the overall resistance for these power cables is below 3 Ohms or less for best possible performance (*please also refer to table A on page 6*). When connecting the BIOC fingerprint reader an RS485 cable is not required however a minimum of 8 cores will be required and the reader should be mounted no more than 50m away from the EX8 controller (*please refer to table R2 above for the recommended cable type to use*). Fig.33 below shows the minimum cable requirements for the FPK1 bio access kit.



THIRD PARTY DEVICES

It should be noted that all the cable information contained within this guide is for Videx products only and are the minimum cable requirements. If any third party device (including but not limited to biometrics, proximity, coded access and any additional peripheral device) is installed along with any of the Videx products then additional cabling should be taken into account for these devices. Videx recommends consulting the accompanying technical manuals or seeking further advice from the appropriate manufacturer for the recommended cable type to use.



INSTALLATION NOTES



IMPORTANT: PLEASE READ THESE INSTRUCTIONS CAREFULLY BEFORE COMMENCING WITH THE INSTALLATION.

Videx recommends that any cabling and Videx product be installed by a competent and qualified electrician, security installation specialist or communications engineer.

DO NOT install any Videx product in areas where the following may be present or occur:

- Excessive oil or a grease laden atmosphere.
- Corrosive or flammable gases, liquids or vapours.
- Possible obstructions which would prevent or hinder the access and/or removal of the Videx product.

CONNECTION TO MAINS SAFETY AND GUIDANCE NOTES

The system **MUST** be installed in accordance with the current I.E.E regulations (*in particular I.E.E Wiring regulations BS7671*), or the appropriate standards of your country, in particular Videx recommends:

- Connecting the system to the mains through an **all-pole circuit breaker** (*refer to Fig.34 opposite*) which shall have contact separation of at least 3mm in each pole and shall disconnect all poles simultaneously.
- That the **all-pole circuit breaker** shall be placed in such a way to allow for easy access and the switch shall remain readily operable.
- Ensuring that the mains supply (*Voltage, Frequency and Phase*) complies with the product rating label.
- Isolating the mains before carrying out any maintenance work on the system.

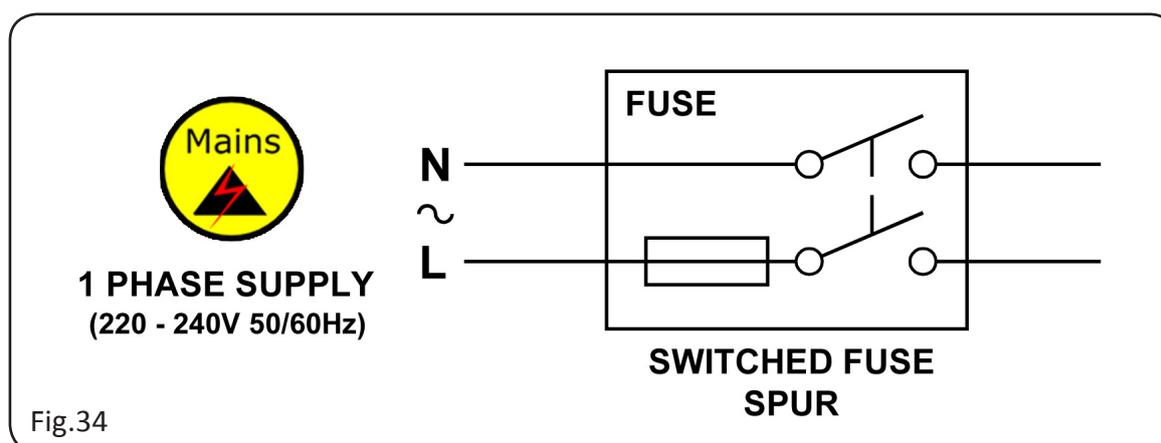


Fig.34

POWER SUPPLY INSTALLATION

Videx provide several power supply units the mounting and installation of which may vary for each unit. Please refer to the following notes:

DIN Rail Mount Power Supplies

The following Videx power supplies which are covered: Art.321, Art.322, Art.324, Art.520M, Art.520MR, Art.521, Art.521B, Art.850K, Art.850KMV and Art.893N.

- First remove the terminal side covers by unscrewing the retaining screws.
- Fix the power supply to a DIN rail/bar or directly to the wall using two expansion type screws.
- Switch OFF the mains using the circuit breaker mentioned previously on page 26 and then make the connections as shown on the installation diagrams.
- Check the connections and secure the wires into the terminals.
- Replace the terminal covers and fix them back into place using the relevant screws.
- When all connections are made restore the mains.

Unboxed Power Supplies

The following unboxed Videx power supplies which are covered: PSU110, PSU-3R and G13804NUV. It should be noted that these power supplies are suitable for fixed installation only and **MUST NOT** be connected externally unless mounted in an IP rated housing/cabinet.

- First mount the power supply on a flat vertical surface in the correct orientation using the appropriate fixing screws.
- The power supply should be installed to allow for maximum air movement where possible and avoid areas with high humidity.
- Switch OFF the mains using the circuit breaker mentioned previously on page 26 and then make the connections as shown on the installation diagrams.
- Check the connections and secure the load and all associated wiring observing the correct polarity of the DC outputs (*the cable size must be of sufficient size and rating to carry currents for all loads connected to the power supply*).
- Any mains cables and low voltage cables should be routed separately to the power supply.
- When all connections are made restore the mains.

Boxed Power Supplies

The following boxed Videx power supplies which are covered: SP24, SP27, SP28, SP29 and SP30. It should be noted that these power supplies are suitable for fixed installations only and for installations as permanently connected equipment. They **MUST NOT** be connected externally.

- First mount the power supply on a flat vertical surface in the correct orientation i.e. with the hinge on the left hand side using the appropriate fixing screws.
- The power supply should be installed to allow for maximum air movement where possible and avoid areas with high humidity.
- They should be mounted with a minimum of 100mm clearance between the sides and lid of the power supply case and any adjacent wall, ceiling or other partition.
- Switch OFF the mains using the circuit breaker mentioned previously on page 26 and then make the connections as shown on the installation diagrams.
- Check the connections and secure the load and all associated wiring observing the correct polarity of the DC outputs (*the cable size must be of sufficient size and rating to carry currents for all loads connected to the power supply*).
- Any mains cables and low voltage cables should be routed separately to the power supply.
- When all connections are made restore the mains.

PART NO. INDEX

AUDIO SYSTEMS

Part Number Index	System Type	Page No.	
4K-1 to 4K-12 (4000 series flush kit)	3+1 audio	6 - 8	
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*Includes 6K video kit versions with Art.6272 videophones (add suffix '-6K' to kit part code).

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ADDITIONAL NOTES

Hazards Associated with CCS and CCA Cables

The main problems arise when both CCA and CCS are passed off as pure copper cables. Neither are suitable for applications where pure copper has been specified, and can cause long term problems which can be costly to rectify once the cable has been installed.

Another issue associated with using CCS and CCA cables is that aluminium and steel have a much higher resistance than copper. This leads to a decrease in current carrying capacity over longer distances. Aluminium is also far more brittle than copper and this can lead to breakages during installation.

These cables are also prone to fatigue at the point of termination which can cause random faults. For example on an alarm system using a CCA cable this can lead to false readings and false alarms, whilst on a video system using a CCS coax cable it can lead to degradation of picture quality, particularly over long distances.

GLOSSARY OF TERMS

Gauge	Gauge and Size	<i>A term used to denote the physical size of a wire.</i>
AWG	American Wire Gauge	<i>The american wire gauge is an industry recognised wire gauge system for designating wire diameter and is used to determine the cross sectional area of a cable (also refer to pages 3 and 4).</i>
CSA	Cross Sectional Area	<i>The cross sectional area of a cable is useful when selecting a cable for installation as it is an important factor for determining its current carrying capacity. The higher the cross sectional area of a cable the greater the current carrying capacity (also refer to pages 3 and 4).</i>
OD	Overall Diameter	<i>The overall diameter refers to the total outer diameter of the cable including all conductors within the cable, any braided shielding or foil and the outer insulation sheath. This is particularly helpful when selecting cable to fit into a specific size ducting or cable tray during first fix installation.</i>
CCA	Copper Clad Aluminium	<i>Copper clad aluminium is an aluminium conductor with a thin copper coating. Aluminium is a cheaper, less conductive metal than copper and substituting copper clad aluminium substantially reduces the copper content and therefore the cost of producing the cable.</i>
CCS	Copper Coated (clad) Steel	<i>Copper coated steel is similar to copper clad aluminium in that a steel conductor is thinly coated with a layer of copper. Steel gives higher mechanical strength than aluminium, but is heavier and less flexible and is also less conductive than copper. It is manufactured in the same way as copper clad aluminium.</i>
BC	Bare Copper	<i>Wire and cable manufacturing with copper conductors can come with different 'wire coatings' in order to change the wires conductivity. Bare copper cable refers to the composition of the cable conductor being manufactured from pure copper without any additional 'coating' or 'tinning'. (Also refer to CCA and CCS above as an example of this).</i>
UTP	Unscreened Twisted Pair	<i>Unscreened twisted pair cable refers to the conductors of a cable being twisted together in pairs (usually with a fixed/specific number of twists per metre) without any additional braided or foil shielding.</i>
NC	Non-Coax (balanced) video signal	<i>Non-coax refers to a balanced video signal V1 and V2 where a single conductor wire from a twisted pair cable is used for each of the balanced video signals. For example a single pair (blue and blue/white) from a standard CW1308 cable can use the blue wire for the V1 signal and the blue/white wire for the V2 signal.</i>
Coax	Coaxial (composite) video signal	<i>Coax cable refers to a composite video signal cable consisting of a single physical central 'channel' that carries the signal surrounded (after a layer of insulation) by another concentric physical 'channel' known as the screen, both running along the same axis. The outer 'channel' serves as a ground connection for the central signal 'channel'.</i>
DOL	Door Open LED	<i>The Door open LED is used when door monitoring is required and is included on specific intercom panels, audiophones or videophones. This can be achieved when door contacts are included on an installation (usually two additional cable cores are required) where the door contacts are used to signal the LED to indicate when the door has been triggered or opened.</i>
VR	Vandal Resistant	<i>Vandal resistant refers to the style and finish of either the intercom panel or a specific model of handsfree audio eclipse or video eclipse (VR5178 and VR5478 units). Both VR intercom panels and VR audio and video eclipse units are manufactured using 2.5mm 12 gauge brushed stainless steel.</i>
EMI	Electromagnetic Interference	<i>Electromagnetic interference (also referred to as radio-frequency interference RFI) is disturbance that affects an electrical circuit due to either electromagnetic induction or electromagnetic radiation emitted from an external source.</i>



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