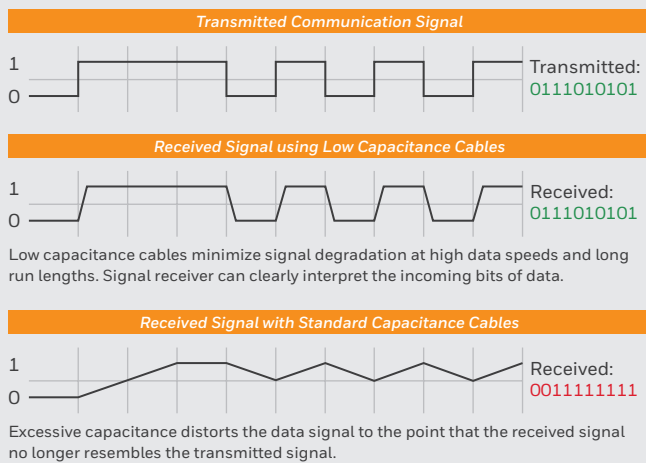# Intelligent Building System Cables

Intelligent Building Systems (IBS) employ two types of cables: communication and signal. Communication cables are used to network controllers. Signal cables connect inputs and outputs to their controllers.

Communication circuits must be able to support high speed data transfer for long distances. Because of this it's important to select the right cables that have low capacitance and correctly matched characteristic impedances.

For signal circuits, the capacitance and impedance levels of the cables are less critical. For these circuits, the limiting factor is DC resistance. The gauge of the cables should be selected to minimize voltage drop based on the length of the run and the load of the circuit.
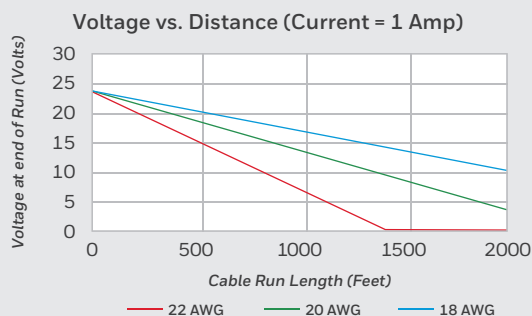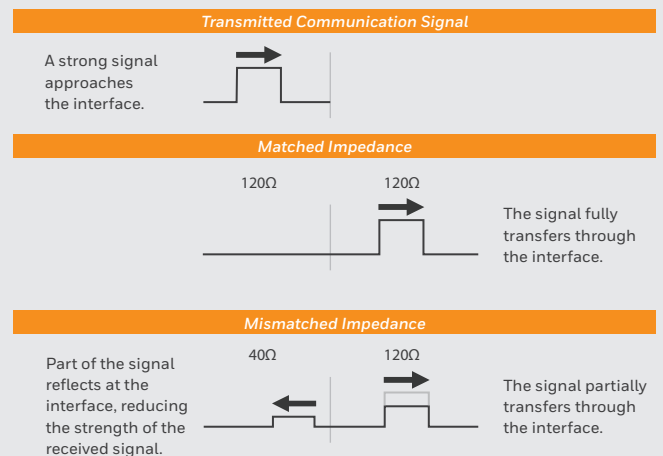
Capacitance

Capacitance resists changes in voltage levels. For high-speed data transfer, excessive capacitance can distort digital signals and lead to system malfunction. The higher the data transmission rate and the longer the cable run, the more critical is it to use low-capacitance cables to ensure proper system function.

Transmitted Communication Signal

Transmitted: 0111010101

Received Signal using Low Capacitance Cables

Received: 0111010101

Low capacitance cables minimize signal degradation at high data speeds and long run lengths. Signal receiver can clearly interpret the incoming bits of data.

Received Signal with Standard Capacitance Cables

Received: 0011111111

Excessive capacitance distorts the data signal to the point that the received signal no longer resembles the transmitted signal.

Characteristic Impedance

At electrical interfaces, such as between the end of a cable run and a receiver device, the impedances must be closely matched to ensure efficient signal transfer. If the mismatch in impedances is too large, portions of the signal will reflect at the interface, which leads to a reduction in the signal amplitude, or return loss.

Transmitted Communication Signal

A strong signal approaches the interface.

Matched Impedance

120Ω   120Ω

The signal fully transfers through the interface.

Mismatched Impedance

Part of the signal reflects at the interface, reducing the strength of the received signal.

40Ω   120Ω

The signal partially transfers through the interface.

Voltage vs. Distance (Current = 1 Amp)

Voltage at end of Run (Volts)

Cable Run Length (Feet)

22 AWG   20 AWG   18 AWG

DC Resistance

As the distance of a cable run increases, circuit resistance increases too. Higher resistance leads to increased voltage drop, which means a decrease in signal strength. For longer runs, larger conductors should be used to minimize voltage drop.

Communication Cables							
Product Code	Description	Communication Standard	Characteristic Impedance (Ω)	Capacitance (pF/ft.)	Color	Packaging	Part Number
3319	24/1pr Stranded Shielded CMP	EIA-485, MS/TP, BACnet®	115	12.5	Blue	1000' Reel-in-a-Box	33192106
3323	24/1.5pr Stranded Shielded CMP	EIA-485, MS/TP, BACnet®	115	12.5	Natural	1000' Reel-in-a-Box	33232112
					Orange	1000' Reel-in-a-Box	33232103
3320	22/1pr Stranded Shielded CMP	EIA-485, MS/TP, BACnet®	115	12.5	Orange	1000' Reel-in-a-Box	33202103
					Green	1000' Reel-in-a-Box	33202105
					Blue	1000' Reel-in-a-Box	33202106
3324	22/1.5pr Stranded Shielded CMP	EIA-485, MS/TP, BACnet®	115	12.5	Blue	1000' Reel-in-a-Box	33242106
3328	22/2pr Stranded Shielded CMP	EIA-485, MS/TP, BACnet®	115	12.5	Brown	1000' Reel-in-a-Box	33282107
3322	18/2pr Stranded Shielded CMP	EIA-485, MS/TP, BACnet®	115	12.5	Orange	1000' Reel	33221003
3252	22/1pr Stranded CMP	Echelon LonWorks®	100	14.5	White	1000' Reel-in-a-Box	32522101
					Yellow	1000' Reel-in-a-Box	32522102
					Blue	1000' Reel-in-a-Box	32522106
					Purple	1000' Reel-in-a-Box	32522110
					White with Orange Stripe	1000' Reel-in-a-Box	3252213A
3253	22/2pr Stranded CMP	Echelon LonWorks®	100	14.5	White	1000' Reel-in-a-Box	32532101
					Blue	1000' Reel-in-a-Box	32522106
3254	22/1pr Stranded Shielded CMP	Echelon LonWorks®	100	14.5	White	1000' Pull Box	32541101
					Blue	1000' Reel-in-a-Box	32542106
3255	22/2pr Stranded Shielded CMP	Echelon LonWorks®	100	14.5	White	1000' Pull Box	32551101
4652	18/1pr Stranded Shielded CMP		60	25.0	Purple	1000' Reel-in-a-Box	46522110

Signal, I/O Cables						
Product Code	Description	DC Resistance (Ω/1000 ft.)	Capacitance (pF/ft.)	Color	Packaging	Part Number
3114	18/2 Stranded CMP/CL2P	6.66	32.2	Natural	1000' Reel-in-a-Box	31142112
				Yellow	1000' Reel-in-a-Box	31142102
				Orange	1000' Reel-in-a-Box	31142103
				Green	1000' Reel-in-a-Box	31142105
				Blue	1000' Reel-in-a-Box	31142106
				Purple	1000' Reel-in-a-Box	31142110
3126	18/3 Stranded CMP/CL2P	6.66	32.2	Natural	1000' Reel-in-a-Box	31262112
				Yellow	1000' Reel-in-a-Box	31262102
				Green	1000' Reel-in-a-Box	31262105
				Blue	1000' Reel-in-a-Box	31262106
3115	18/4 Stranded CMP/CL2P	6.66	32.2	Natural	1000' Reel-in-a-Box	31152112
				Orange	1000' Reel-in-a-Box	31152103
				Green	1000' Reel-in-a-Box	31152105
3214	18/2 Stranded Shielded CMP/CL2P	6.66	59.3	Natural	1000' Reel-in-a-Box	32142112
				Yellow	1000' Reel-in-a-Box	32142102
				Orange	1000' Reel-in-a-Box	32142103
				Green	1000' Reel-in-a-Box	32142105
				Blue	1000' Reel-in-a-Box	32152106
				Purple	1000' Reel-in-a-Box	32152110
3226	18/3 Stranded Shielded CMP/CL2P	6.66	50.8	Natural	1000' Reel-in-a-Box	32262112
				Yellow	1000' Reel-in-a-Box	32262102
				Orange	1000' Reel-in-a-Box	32262103
				Green	1000' Reel-in-a-Box	32262105
				Blue	1000' Reel-in-a-Box	32262106
				Purple	1000' Reel-in-a-Box	32262110
3215	18/4 Stranded Shielded CMP/CL2P	6.66	50.8	Natural	1000' Reel-in-a-Box	32152112
				Yellow	1000' Reel-in-a-Box	32152102
				Orange	1000' Reel-in-a-Box	32152103
				Green	1000' Reel-in-a-Box	32152105
				Blue	1000' Reel-in-a-Box	32152106

Cable for That! app – Provides an easy-to-use and accessible guide that helps you choose the right cable for your application – go to our website and use your mobile device to download the app that's right for you.

3-for-1 Guarantee – Our confidence in our products translates into the most comprehensive warranty in the industry – replacing three units to one – should any fail to perform to specification.

Please visit www.honeywellcable.com **for more information, including a detailed cable catalog or to download our Cable for That! App, and get access to information on-the-go!**

Honeywell Cable Selection Guide

Honeywell Cable Part Numbers			
All Genesis® Series Cable products have an eight digit product number composed of:	AAAA ⌣ Product Code	BB ⌣ Pkg Code	CC ⌣ Color Code

BB: Packaging Code	Put Up
01	1 x 250' Reel
03	4 x 250' Reel
10	1000' Reel
11	1000' Reel Box
18	1000' Speed Bag®
21	1000' Reel in-a-Box
39	5 x 50' Coil
48	4 x 500' Reel
50	500' Reel
55	500' Box
58	500' Speed Bag®
61	500' Real in-a-Box

CC: Color Code	Color
01	White
02	Yellow
03	Orange
04	Red
05	Green
06	Blue
07	Brown
08	Black
09	Gray
10	Purple
11	Pink
12	Natural
13	Beige
37	Raspberry
1A	White with Orange