COMMSCOPE®

Design guidelines for
SYSTIMAX® GigaREACH™ XL
extended-reach Category 6 cable

August 2024

APPLICATIONS

SYSTIMAX GigaREACH XL is a Category 6 four-pair cable intended for use in extended-distance or elevated-temperature environments. The cable is constructed using a patented pair structure that minimizes cable diameter and pair size while employing a 21 AWG conductor. The result is a cable with 20% better insertion loss and half the direct current (DC) resistance of minimally compliant Category 6 cable. Improved DC resistance enables support for power over Ethernet (PoE) applications at all PoE levels, while the significantly improved insertion loss maximizes the distance over which the most popular 10/100/1000BASE-T applications operate. GigaREACH XL provides customers a way to easily connect and power devices beyond the 100-meter limit, with one cable and with little or no disruption to existing services. It requires no additional telecom rooms, PoE extenders, or optical equipment, which translates into fewer points of failure, lower installation costs, and lower greenhouse gas emissions. The ability to reach these limits with up to a four-connector channel means there is no need to deviate from traditional, flexible, and customizable design and installation practices.

Building upon CommScope's cable engineering knowledge, GigaREACH XL is compatible with the SYSTIMAX MGS outlets and 1100GS panels. When paired with up to 10 meters of SYSTIMAX Cat 6/6A cords, applications such as 1000BASE-T (1 Gbps) up to 150 m, 100BASE-T (100 Mbps) up to 200 m, and 10BASE-T (10 Mbps) up to 250 m are supported. IEEE 802.3bt (90-watt) PoE support for channels up to 250 m long are assured. If GigaREACH XL is used to construct modular plug-terminated links, the cable is fully compatible with and can be terminated using the CommScope Ceiling Connector Assembly (CCA) or our GigaREACH modular field-term plug kits and boots (optional).

GigaREACH XL CHANNEL/LINK APPLICATION SUPPORT MATRIX

	10 Mbps			100 Mbps			1 Gbps		
	Channel	PL	MPTL	Channel	PL	MPTL	Channel	PL	MPTL
Maximum number of connectors	4	3		4	3		4	3	
Maximum cord length (MCL)	10 m	8 m	9 m	10 m	8 m	9 m	10 m	8 m	9 m
Maximum xx73A length	250 m - MCL			200 m - MCL			150 m - MCL		
PoE support	IEEE 802.3bt 90 Watt								

KEY FEATURES AND BENEFITS

|	
Electrical Performance	• ANSI/TIA-568.2-D Category 6 / ISO 11801 Class E performance compliant • Half the DC resistance of traditional Cat 6 cable • 20% improved insertion loss over Category 6 • Full support for IEEE 802.3af, 802.3at and 802.3bt PoE applications in four-connector channels up to 250 m in length
Mechanical features	• Available in riser, LSZH and OSP; plenum version to be introduced in 4Q24 • Operating/installation temperature: -4°F to 140°F (-20°C to 60°C) / 32°F to 140°F (0°C to 60°C) • Diameter over jacket/jacket thickness: Riser and LSZH cables 6.73 mm / 0.64 mm (0.265 in. / 0.025 in.). Diameter over jacket OSP cables 7.11 mm (0.28 in.)
Compliance	• Compatible with SYSTIMAX connectivity including MGS outlets, 1100GS panels, CCA connectors and assemblies • RoHS compliant • Safety compliance: UL 444; nationally recognized test lab confirmation of BASE-T and PoE claims

GigaREACH XL CHANNEL COMPONENTS

GigaREACH XL cables (xx73 series)
GigaSPEED XL MGS400 modular outlets
GigaSPEED X10D MGS600 modular outlets
GigaSPEED XL 1100GS3 modular patch panels
GigaSPEED X10D 1100GS6 modular patch panels
GigaSPEED XL modular cords
GigaSPEED X10D modular cords
CommScope MiNo6 modular cords*
CommScope MiNo6A modular cords*
CCA connectors and connector assemblies
GigaREACH modular field-term plug kits and plug boots (optional)
VisiPatch 360® patch panels

* Consult your local CommScope system engineer (SE) to determine the impact of
28 AWG cords on channel length
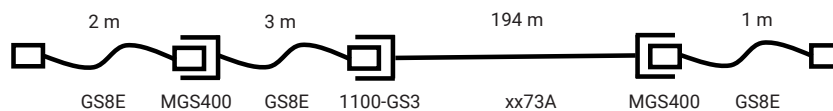
CHANNEL CONFIGURATIONS

GigaREACH XL is fully compatible with the SYSTIMAX MGS400 and MGS600 information outlets and 1100GS3 and 1100GS6 panels.
When paired with up to 10 m of SYSTIMAX GS8E or GS10E cords, four connector channels constructed using GigaREACH XL support
1 Gbps up to 150 m, 100 Mbps up to 200 m, and 10 Mbps up to 250 m. Some examples of more traditional network architectures are
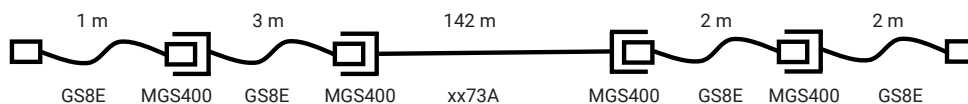provided below.

Four-connector channel with 10 meters of cordage supporting 10 Mbps

2 m		3 m		240 m		1 m		4 m
GS8E	MGS400	GS8E	MGS400	xx73A	MGS400	GS8E	MGS400	GS8E
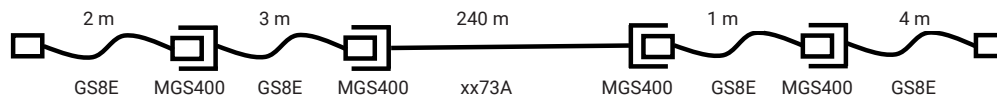
Three-connector channel with 6 meters of cordage supporting 100 Mbps

2 m		3 m		194 m		1 m
GS8E	MGS400	GS8E	1100-GS3	xx73A	MGS400	GS8E

Four-connector channel with 8 meters of cordage supporting 1 Gbps

| 1 m		3 m		142 m		2 m		2 m
GS8E	MGS400	GS8E	MGS400	xx73A	MGS400	GS8E	MGS400	GS8E

GigaREACH XL compatibility with the ceiling connector assembly (CCA) and modular field-term plug (MFTP) provides customers with the tools to push through boundaries present in mixed environment networks.

Channel formed using a modular plug-terminated link (MPTL) and 3 meters of cordage supporting 1 Gbps
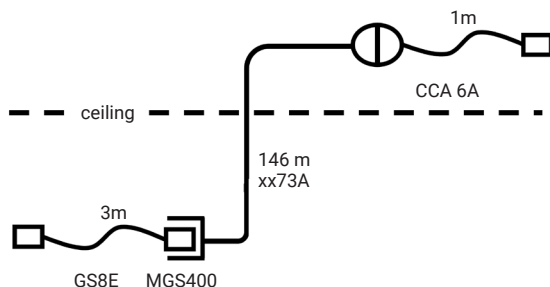
Two connector channel with CCA cable transition and the modular field-terminated plug (MFTP) supporting 10 Mbps
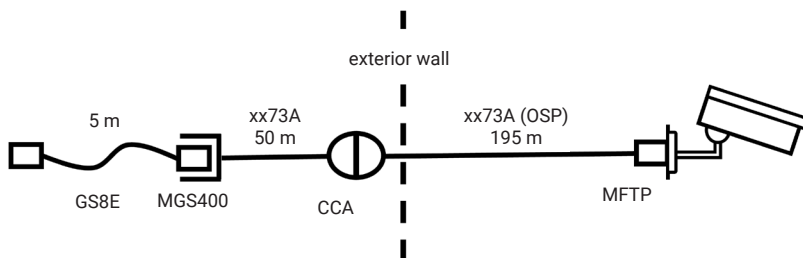
ELEVATED TEMPERATURE PERFORMANCE

All copper cabling channels operating at elevated temperatures will experience elevated insertion loss. The GigaREACH XL cable family was designed to resist the effects of elevated temperatures through careful choice (and amount) of insulation and jacketing materials. The result is a cable family that de-rates with temperature at a rate slower than that specified by TIA 568.2-D. When operating at elevated temperatures, the following four-step algorithm is more than sufficient to determine what length de-rating, if any, may be necessary.

Step 1: Adjust the cord lengths to the new (longer) length by calculating the product of the physical length of the cord and the temperature-dependent de-rating factor provided in TIA 568.2-D.

$$[1 + \delta_1(T - 20\ ^\circ\text{C}) + \delta_2(T - 40\ ^\circ\text{C})]$$

| Temperature (°C)	δ_1	δ_2
20°C to 40°C	0.00393	0.00000
40°C to 60°C	0.00393	0.00248

Step 2: Sum the new temperature corrected lengths of all cords.

Step 3: Subtract the value in Step 2 from the maximum channel length for the intended application.

Step 4: De-rate that value obtained in Step 3 based on the temperature that the horizontal cable will be expected to operate at.

This derated value is the quotient of the physical length and the temperature-based de-rating factor.

Consider the example of a two-connector channel supporting a 1 Gbps application in an elevated- temperature environment. The 3 m cord is operating in an environment whose temperature is 23°C, the 1 m cord is operating at a temperature of 45°C, and the long segment of horizontal cable is operating at an average temperature of 34°C.
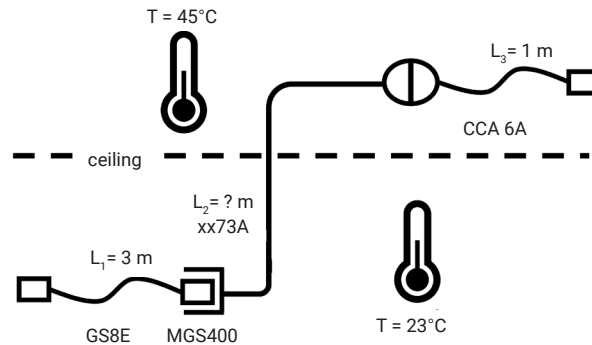
Step 1:　$L'_1 = L_1\big(1 + 0.00393(23\ °C - 20\ °C)\big) = 3.04\ m$

$L'_3 = L_3\big(1 + 0.00393(45\ °C - 20\ °C) + 0.00248(45\ °C - 40\ °C)\big) = 1.11\ m$

Step 2:　$L'_1 + L'_3 = 4.15$

Step 3:　$L_2 = 150\ m - 4.15\ m = 145.85$

Step 4:　$L_2^{final} = 145.85\ m/\big(1 + 0.00393(34\ °C - 20\ °C)\big) = 138.2\ m$

Maximum channel length is $L_{channel} = 138.2\ m + 3\ m + 1\ m = 142.2\ m$

The result shows that a channel operating in an elevated temperature described above may need to be shortened to a length of 142.2 m. For convenience, the maximum de-rated horizontal cable length in meters at various temperatures and for the three GigaREACH XL supported applications assuming 10 m of 24 AWG cordage at 20°C is provided. If necessary, consult your local CommScope SE for guidance.

Average horizontal cable temperature		Maximum horizontal cable (GigaREACH XL)		
Celsius	Fahrenheit	10 Mbps	100 Mbps	1 Gbps
20	68	240.0	190.0	140.0
25	77	235.4	186.3	137.3
30	86	230.9	182.8	134.7
35	95	226.6	179.4	132.2
40	104	222.5	176.2	129.8
45	113	216.1	171.1	126.1
50	122	210.0	166.3	122.5
55	131	204.3	161.7	119.2
60	140	198.9	157.4	116.0

CommScope pushes the boundaries of communications technology with revolutionary ideas and ground-breaking discoveries that spark profound human achievement. We collaborate with our customers and partners to design, create and build the world's most advanced networks. It is our passion and commitment to identify the next opportunity and realize a better tomorrow.

For more information, visit the SYSTIMAX 2.0 solutions page
www.systimax.com

SYSTIMAX®
COMMSCOPE