Littleben™

Ultra-Flexible High-Performance Cables

Littlebend™ Cables are
Manufactured & Distributed by:

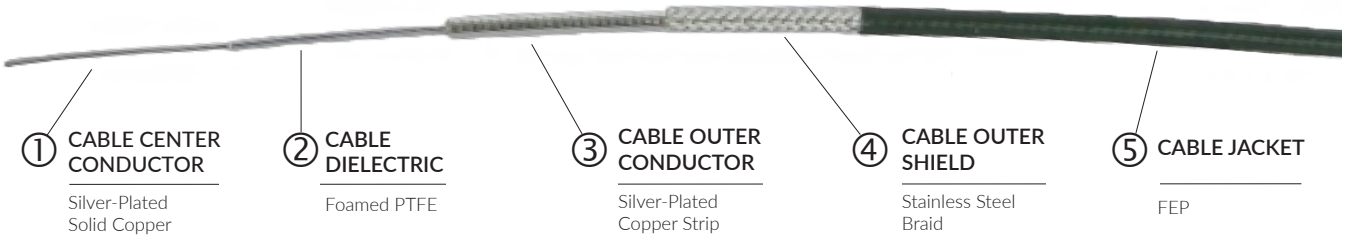
HASCO COMPONENTS

HLB055

HLB055 /055A CABLE SPECS

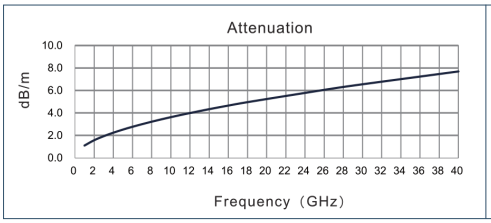
VELOCITY OF PROPAGATION	78.7%
TIME DELAY	1.27 ns/ft 4.24 ns/m
CAPACITANCE	25.9 pF/ft (85 pF/m)
WITHSTANDING VOLTAGE	500V
INSULATION RESISTANCE	1,000 MΩ
SHIELDING EFFECTIVENESS	>100dB
PHASE STABILITY VS FLEXURE	± 8° @ 110GHz
AMPLITUDE STABILITY	<± 0.1dB @ 110GHz
DURABILITY	1,000 Cycles Min.
OPERATING TEMPERATURE RANGE	-55° C to +85 ° C
MINIMUM BEND RADIUS	Armored: .79" (20mm) Non-Armored: 0.2" (5mm)
DURABILITY	1,000 Cycles Min

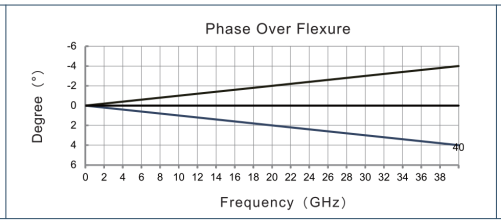
HLB055 CABLE CONSTRUCTION

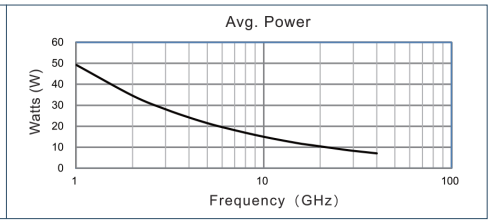


HLB055 CABLE TYPICAL PERFORMANCE DATA (Typical @ 25°C) & Power (40°C, Sea Level)

Frequency GHz	1	2	3	4	5	6	8	10	12	14	16	18	26.5	30	40	50	60	67	110
VSWR	1.05	1.07	1.09	1.06	1.13	1.09	1.16	1.11	1.15	1.17	1.23	1.20	1.25	1.21	1.26	1.31	1.25	1.37	1.41
Insertion Loss (dB)	0.34	0.52	0.68	0.77	0.86	0.99	1.13	1.31	1.42	1.58	1.67	1.78	2.12	2.25	2.54	2.83	3.27	3.54	5.07





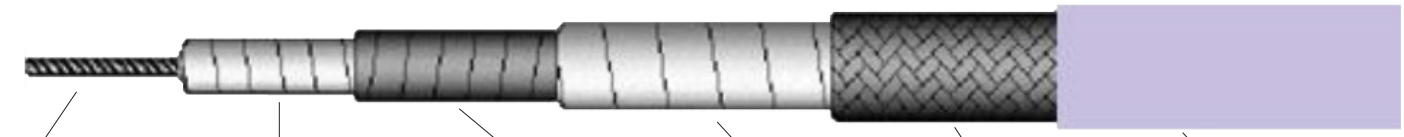


HLB098 CABLE SPECS

HLB098

VELOCITY OF PROPAGATION	76%
TIME DELAY	1.31 ns/ft (4.39 ns/m)
CAPACITANCE	27.4 pF/ft (90 pF/m)
WITHSTANDING VOLTAGE	900V
INSULATION RESISTANCE	1,000 MΩ
SHIELDING EFFECTIVENESS	<-90dB
PHASE STABILITY VS FLEXURE	±4° @ 40 GHz
AMPLITUDE STABILITY	<±0.05dBm @ 18 GHz
DURABILITY	1,000 Cycles Min.
OPERATING TEMPERATURE RANGE	-65° C to +165 ° C
MINIMUM BEND RADIUS	Static: 0.2" (5mm) Repeated: 0.4" (10mm)
DURABILITY	1,000 Cycles Min.

HLB098 CABLE CONSTRUCTION



① **CABLE CENTER CONDUCTOR**
Silver-Plated Solid Copper

② **CABLE DIELECTRIC**
Lower Density PTFE

③ **CABLE OUTER CONDUCTOR**
Silver-Plated Copper Strip

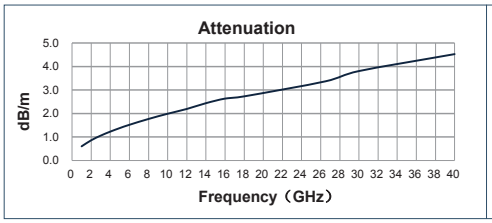
④ **CABLE INTERLAYER**
Aluminum Foil

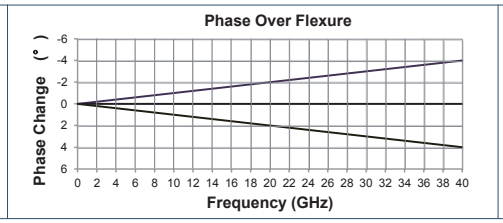
⑤ **CABLE OUTER SHIELD**
Stainless Steel Braid

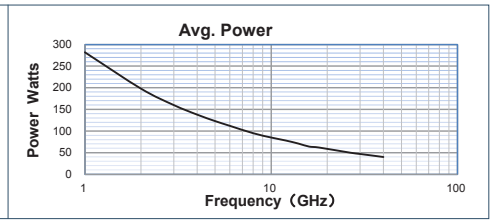
⑥ **CABLE JACKET**
FEP

HLB098 TYPICAL PERFORMANCE DATA (Typical @ 25°C) & Power (40°C, Sea Level)

Frequency GHz	1	2	3	4	5	6	8	10	12	14	16	18	26.5	30	40
Attenuation dB/m	0.60	0.86	1.06	1.23	1.38	1.52	1.77	1.99	2.19	2.44	2.64	2.73	3.37	3.81	4.53
Avg. Power W	103	72	59	50	45	41	35	31	28	27	25	23	18	16	14







CHALLENGES OF TRADITIONAL RF CABLE ASSEMBLIES

Engineers designing high-frequency systems often face several challenges:

- **Tight Space Constraints:** Many RF and microwave applications require compact designs with minimal bending radii, making rigid or semi-rigid cables impractical.
- **Signal Integrity Issues:** High-frequency cables must maintain phase and amplitude stability, even when subjected to repeated flexing.
- **Connector Limitations**: Right-angle connectors are often necessary to fit cables into small enclosures, but they introduce additional insertion loss and mechanical stress points.
- **Durability Concerns:** Frequent movement, vibrations, and extreme temperatures can degrade cable performance over time, leading to signal loss and system failures.

To address these concerns, HASCO developed the LittleBend™ series, which offers a breakthrough in flexibility and electrical performance without the trade-offs associated with traditional solutions.

COMPARISON WITH COMPETITOR OFFERINGS

FEATURE	HASCO LittleBend™	TIMES MICROWAVE InstaBend™	HUBER+SUHNER MiniBend™	MEGAPHASE HyperFlex™
Minimum Bend Radius	0.2" (5mm)	0.25" (6.35mm)	0.25" (6.35mm)	0.3" (7.6mm)
Shielding Effectiveness	>90dB	>90dB	>85dB	>85dB
Retention Force	>90N	80N	67N	75N
Phase Stability	±4° @ 40 GHz	±6° @ 40 GHz	±5° @ 40 GHz	±5° @ 40 GHz
Amplitude Stability	<±0.05dB @ 18 GHz	<±0.1dB @ 18 GHz	<±0.1dB @ 18 GHz	<±0.1 dB @ 18 GHz
Maximum Frequency	65 GHz	50 GHz	65 GHz	50 GHz
Durability (Flex Cycles)	1,000+	500+	750+	500+

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A Quality Source for RF and Microwave Engineers

BENEFITS OF LITTLEBEND CABLE ASSEMBLIES

1. Ultra-Flexibility with Tight Bend Radius

LittleBend™ cables are designed for demanding applications where space is limited. With a minimum static bend radius of just 0.2 inches (5mm) and repeated bend capability at 0.4 inches (10mm), LittleBend™ outperforms many competitors that require larger bend radius for stability.

2. Elimination of Right-Angle Connectors

Unlike traditional cables that require right-angle connectors to accommodate tight spaces, LittleBend™ allows for extreme flexibility while maintaining electrical performance, eliminating the need for these bulky and loss-inducing connectors.

3. Exceptional Shielding Effectiveness

With a shielding effectiveness of >90 dB, LittleBend™ ensures superior EMI suppression, which is critical in sensitive applications such as aerospace and military communications.

4. High Retention Force and Durability

LittleBend™ cables boast a retention force of >90N,ensuring a secure connection that can withstand mechanical stress. In comparison, Huber+Suhner's MiniBend™ offers a retention force of only 67N.

5. Superior Phase and Amplitude Stability

High-frequency applications demand consistent electrical performance even under flexure. LittleBend™ provides phase stability of ±4° @ 40 GHz and amplitude stability of <±0.05 dB @ 18 GHz, outperforming competitors in dynamic environments.

6. Broad Frequency Range and Low Loss

LittleBend™ is engineered to support frequencies up to 65 GHz, making it suitable for emerging high-frequency applications in 5G, satellite communications, and radar systems.

RIOR ALTERNATIVE

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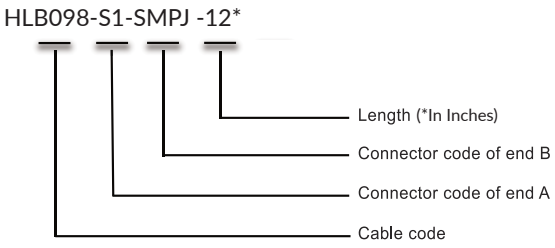
AVAILABLE CONNECTORS

How to Configure Littlebend Cables



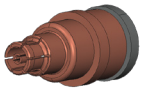
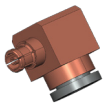
Connector Codes

NP	Type N Male
NJBH	Type N Female Bulkhead
S1	SMA Male
S2BH	SMA Female Bulkhead
SMPJRA	SMP Female Right Angle
SMPPBH	SMP Male Bulkhead
SMPJ	SMP Female
SMPMJ	SMPM Female
SMPMJRA	SMPM Female Right Angle
KP	2.92mm Male
24P	2.4mm Male
VJ	1.85mm Female
VP	1.85mm Male
WJ	*1.0mm Female
WP	*1.0mm Male

Littlebend™ Ultra-Flexible Cable Series are 100% tested for VSWR and insertion loss and are available in standard lengths from 3 to 48 inches.
Additional configurations available by special order.

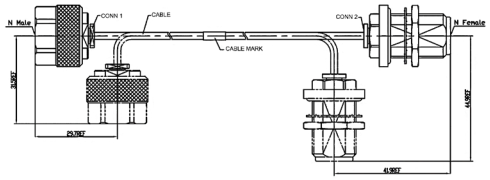
*1.0mm connectors only available with HLB055(A)
*HLB055(A) only available with 1.0mm connectors

NOTE:
Maximum frequency of final cable configuration will be limited to the maximum frequency of the lowest frequency connector.

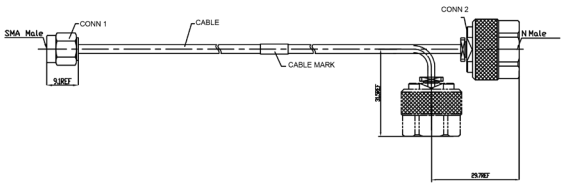
Connector Type	Connector Code	Frequency*	Material	Max VSWR
	Type N Male = NP	18 GHz	Stainless Steel	1.35:1
	Type N Female Bulkhead = NJBH	18 GHz	Stainless Steel	1.35:1
	SMP Female Right Angle = SMPJRA	18 GHz	Brass	1.30:1
	SMP Male Bulkhead = SMPPBH	18 GHz	Stainless Steel	1.30:1
	SMA Male = S1	26.5 GHz	Stainless Steel	1.25:1
	SMA Female Bulkhead = S2BH	26.5 GHz	Stainless Steel	1.30:1
	SMP Female = SMPJ	40 GHz	Brass	1.30:1
	SMPM Female = SMPMJ	40 GHz	BeCu	1.35:1
	SMPM Female Right Angle = SMPMJRA	40 GHz	BeCu	1.35:1
	2.92mm Male = KP	40 GHz	Stainless Steel	1.30:1
	2.4mm Male = 24P	50 GHz	Stainless Steel	1.30:1
	1.85mm Male = VP	67 GHz	Stainless Steel	1.40:1
	1.85mm Female = VJ	67 GHz	Stainless Steel	1.40:1
	1.0mm Male = WP	110 GHz	Stainless Steel	1.50:1
	1.0mm Female = WJ	110 GHz	Stainless Steel	1.50:1

SAMPLE OUTLINES

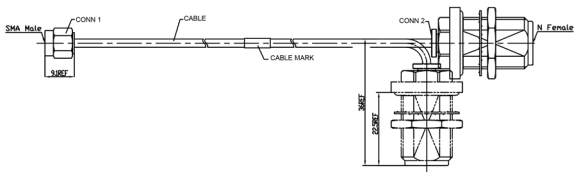
Type N Male to Type N Female Bulkhead
HLB098-NP-NJBH-L



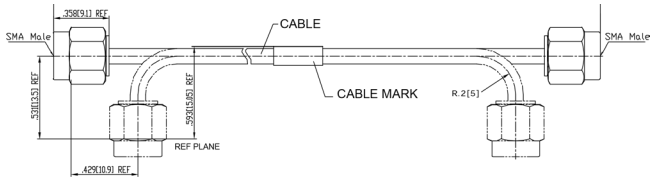
SMA Male to Type N Male
HLB098-S1-NP-L



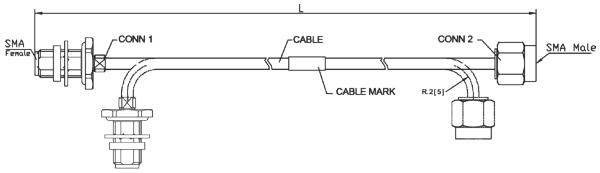
SMA Male to Type N Female Bulkhead
HLB098-S1-NJBH-L



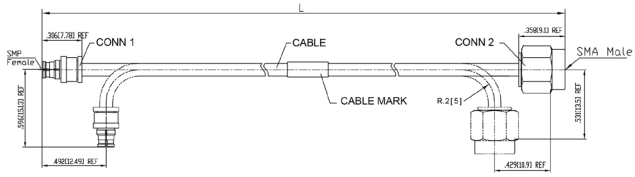
SMA Male to SMA Male
HLB098-S1-S1-L



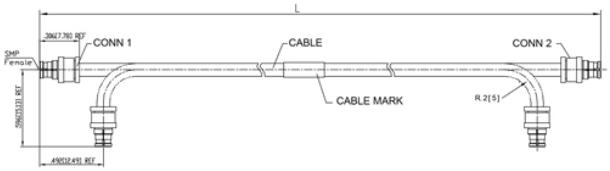
SMA Male to SMA Female Bulkhead
HLB098-S1-S2BH-L



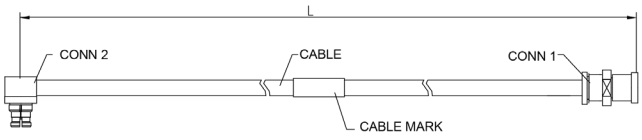
SMA Male to SMP Female
HLB098-S1-SMPJ-L



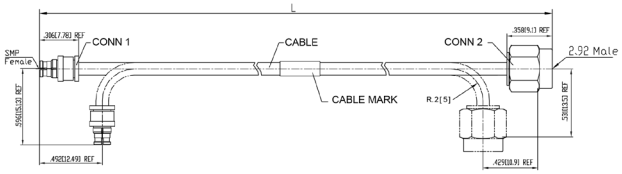
SMP Female to SMP Female
HLB098-SMPJ-SMPJ-L



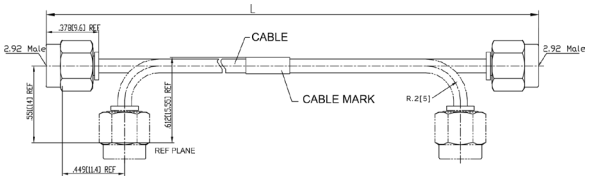
SMP Female Right Angle to SMP Male Bulkhead
HLB098-SMPJRA-SMPPBH-L



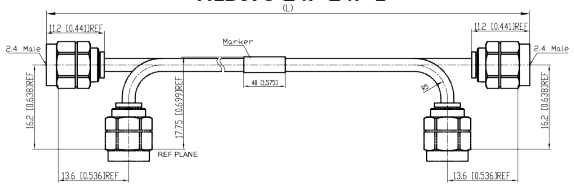
2.92mm Male to SMP Female
HLB098-KP-SMPJ-L



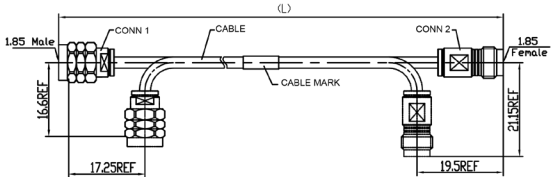
2.92mm Male to 2.92mm Male
HLB098-KP-KP-L



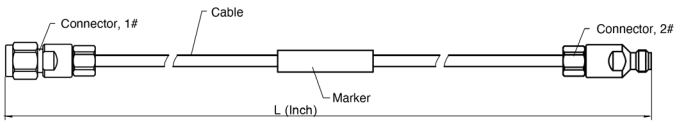
2.4mm Male to 2.4mm Male
HLB098-24P-24P-L



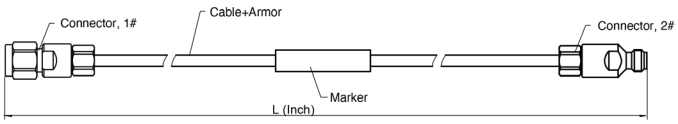
1.85mm Male to 1.85mm Female
HLB098-VP-VJ-L



1.0mm Male to 1.0mm Female
HLB055-WP-WJ-L



1.0mm Male to 1.0mm Female Armored
HLB055A-VP-VJ-L



Most Common Applications of LittleBend™

- **Aerospace and Defense**
  - Radar and Electronic Warfare Systems
  - Satellite Communications
  - Military Avionics
- **Telecommunications**
  - 5G base Stations and mmWave Infrastructure
  - High-Frequency RF Modules
- **Test and Measurement**
  - High-Precision Test Benches
  - Network Analyzers and RF Probes
- **Medical Imaging and Research**
  - MRI and High-Frequency Ultrasound
  - Advanced Research Labs

LittleBend™ by HASCO delivers a breakthrough in flexibility, shielding, and stability, setting it apart from competitors like InstaBend™, MiniBend™, and HyperFlex™. Its combination of ultra-tight bend radius, superior shielding, high retention force, and excellent electrical performance makes it an indispensable solution for engineers in high-frequency, space-constrained applications.

For those seeking the ultimate in performance and reliability, LittleBend™ is the clear choice.

For more information visit:
https://www.hasco-inc.com/Littlebend

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