

MS18-A

GPS 1X8 Military Qualified Splitter

Description

The MS18-A is a military qualified one-input eight-output ruggedized GPS splitter. The MS18-A can be configured to pass DC from any device connected to the RF output port (J2) to the antenna input port (J1) in order to also power an active GPS antenna. The remaining RF outputs (J3 thru J9) feature a 200Ω DC resistive load to ground to simulate a typical antenna current draw for any receiver connected to that output. The MS18-A can also be configured with external DC input (either MIL-STD-704 for aircraft 28V DC or MIL-STD-1275 for ground vehicle 28V DC). Since this is an externally powered configuration, all of the outputs are DC Blocked with 200 ohm loads with either external DC input. The input voltage can be specified to power any active GPS antenna.

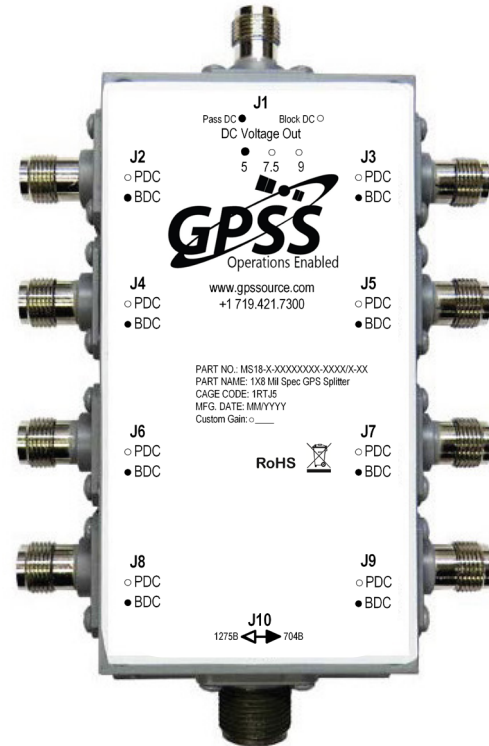
Features

- Designed and Manufactured to Military Specifications
- Passes GPS (including M Code), Galileo, GLONASS L1/L2
- Excellent Gain Flatness (Gain |L1 - L2| < 2dB)
- Amplified and Custom Amplification Options only

The MS18 is designed for ruggedized applications and environments where high reliability and signal availability is required.

It has been designed to meet the following MIL standards:

MIL Standards	
MIL-STD-810	MIL-STD-5400
MIL-STD-1472	MIL-HDBK-454
MIL-STD-202	MIL-STD-1587
MIL-STD-883	MIL-STD-461F
MIL-STD-704	MIL-STD-1275E



MS18-A-PMS-704/5-TF

Options

- Amplified and Custom Gain Options
- Various Connector and Power Options

Please contact GPS Source via phone, email, or visit the website for further information on product options and specifications.

1 MS18-A Specifications

Table 1-1: Electrical Specifications

Operating temperature -40°C to 85°C

Parameter			Conditions	Min	Type	Max	Units
Frequency Range			Ant: Any Port; Unused Ports: 50 Ω	1.1		1.7	GHz
Gain	Standard	Amplified	Ant: Any Port; Unused Ports: 50 Ω	14	15	16	dB
	Custom	Amplified	Custom gain range 00dB to 20dB (Excluding 15dB)	X-1.5	X	X+1.5	
Input SWR			All Ports: 50 Ω			2.0:1	—
Output SWR			All Ports: 50 Ω			2.0:1	—
Noise Figure	15dB Gain	Amplified	Ant: Any Port; Unused Ports: 50 Ω			3.8	dB
Gain Flatness		Amplified	[L1 – L2] Ant: Any Port; Unused Ports: 50 Ω			3	dB
Amp. Balance			(J2 – J3) Ant: Any Port; Unused Ports: 50 Ω			0.5	dB
Phase Balance			Phase (J2 – J3) Ant: Any Port; Unused Ports: 50 Ω			1.0	Degree
Group Delay Flatness			$T_{d,max} - T_{d,min}$; J2 – J1 (Ant)			1.0	nS
Isolation	Normal 15dB Gain	Amplified	Adjacent Ports Ant - 50Ω	16			dB
			Opposite Ports: Ant – 50Ω	22			
	High 00 - 07dB Gain	Amplified	Adjacent Ports Ant - 50Ω 1MHz Tone Spacing	27			
			Opposite Ports: Ant – 50Ω	31			
Input I_{p3}	Amplified		Ant: Any Port; Unused Ports: 50 Ω 1MHz Tone Spacing	-12			dBm
Input P_{1dB}	Amplified		Ant: Any Port; Unused Ports: 50 Ω	-22			dBm
Current ($I_{internal}$)			Current Consumption of MS18 (excludes external antenna)		50	85	mA
Draw Current	Pass DC		Non-Powered Configuration, DC Input on J2			250	mA
Max RF Input		Amplified	Max RF Input Without Damage			30	dBm

Table 1-2: DC IN and OUT Specifications

Parameter		Conditions	Min	Typ.	Max	Units
DC In	Pass DC	Pass DC Non-powered configuration, DC Input at the J2 output port passes inline bias voltage via the input J1 port			12	VDC
	Block DC	All DC Blocked output ports include 200 ohm resistive load to ground standard		Any		
	Powered	Powered 2-pin/3-pin Mil DC connector (MIL-STD-704 & MIL-STD-1275 28V DC surge suppression)	20	28	33	
DC Out ⁽²⁾	Powered	Output voltage at the J1 input port, 5.0, 7.5, 9.0, BDC (Block DC)	5		9	VDC

(2) See MIL-STD-704 for 28V DC input for aircraft surge suppression and MIL-STD-1275 for 28V DC input for ground vehicle surge suppression

Power Connector Options PMS-1275/XX and PMS-704/XX

PIN	Description	PMS-1275/XX and PMS-704/XX Options ⁽³⁾
A	Positive	
B	Ground	

(3) Image is not to scale

Power Connector Options PMS38999-1275/XX and PMS38999-704/XX

Input	Description	PMS38999-1275/XX and PMS38999-704/XX Options ⁽⁴⁾
A	Positive	
B	Ground	
C	No Connect	

(4) Image is not to scale

General Specifications

Description		Measurement
Weight		1.5lbs (680g)
Mean Time Between Failure (MTBF) ⁽⁵⁾	Passive Configuration	389,029 at 29°C
		350,812 at 71°C
	Active Configuration	386,259 at 29°C
		316,877 at 71°C

(5) Calculation derived using Airborne Inhabited Cargo parameters per MIL-STD-217F

2 Performance Data

Figure 2-1: Active MS18-A Splitter: Gain vs. Frequency

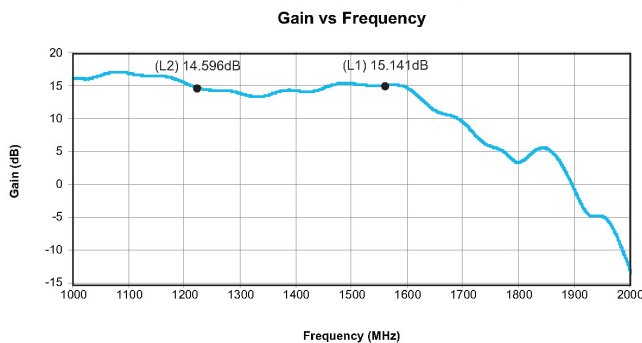
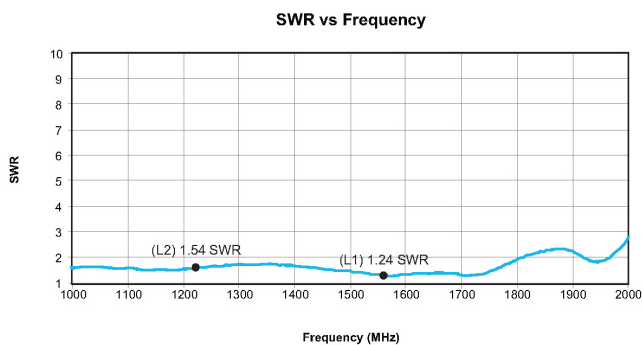


Figure 2-2: Active MS18-A Splitter: SWR vs. Frequency



3 Environmental Requirements

Temperature and Altitude

The MS18-A complies with the temperature-altitude tests per MIL-STD-810C, Method 504, Procedure 1 Equipment Category 5.

Temperature Shock

The MS18-A will withstand without degradation (while not operating) Method 503.1, Procedure 1 of MIL-STD-810C.

Explosive Atmosphere

The MS18-A is designed for operation in the presence of explosive mixtures of air and jet fuel without causing explosion or fire at atmospheric pressures corresponding to altitudes from -1,800 feet to 50,000 feet. The MS18-A does not produce surface temperatures or heat in excess of 400°F. The MS18-A does not produce electrical discharges at an energy level sufficient to ignite the explosive mixture when the equipment is turned on or off or operated. The MS18-A is designed to meet the requirements of MIL-STD-810C, Method 511.1, and Procedure II. Hermetically sealed equipment meeting the requirements of MIL-STD-202, Method 112D, or MIL-STD-883, Method 1014.7 (as applicable), and not exceeding a Helium leakage rate of 1×10^{-7} cc/sec, are exempt from this requirement.

Decompression

The MS18-A is designed to meet the performance standards per RTCA-DO-160E PARA 4.6.2 cat D during and following a rapid and complete loss of normal cabin compartment pressurization (10,000 ft.) from an airplane flight altitude of 50,000 feet within 15 seconds. The MS18-A will remain operating for 5 minutes at 50,000 feet before being returned to normal cabin pressure.

Overpressure

MS18-A is capable of withstanding, for 10 minutes, while not operating, a 12.1 psi compartment pressure with no physical distortion or permanent set per RTCA-DO-160E PARA 4.6.3. The MS18-A will operate satisfactorily upon return to normal pressure.

Salt Fog

The MS18-A meets the requirements of Salt Fog conditions per Paragraph 3.2.24.9 of MIL-E-5400 and MIL-STD-810C Method 509.1. The MS18-A can withstand a salt concentration of 5 percent at a temperature of 35° C for 48 hours without degradation.

Fungus

The MS18-A meets the requirements of Fungus conditions per Paragraph 3.2.24.8 of MIL-E-5400 and MIL-STD-810C Method 509.1 i.e. fungus inert materials per requirement 4 of MIL-HDBK-454.

Humidity

The MS18-A is capable of meeting the requirements of a ten-day humidity test conducted per MIL-STD-810C, Method 507.1, Procedure I. MS18-A can withstand exposure to 95% relative humidity at a temperature of 30° C for 28 days.

Sand and Dust

The MS18-A is capable of meeting the requirements of Sand and Dust conditions of method 510 of MILSTD-810C, for a temperature of 145°F for duration of 22 hours.

Flammability

The MS18-A is self-extinguishing or nonflammable and meets the Requirements of Paragraph 5.2.4 of MIL-STD-1587 and requirement 3 of MIL-HDBK-454.

Finish and Colors

All case surfaces of the MS18-A is treated with chemical film per MIL-DTL-5441, TYPE I, CLASS N. The MS18-A bottom contact surface is free of paint, or non-conductive finishes. The MS18-A bottom contact surfaces are protected from corrosion by a conductive coating (MIL-DTL-5541). All other surfaces, except connector mating surfaces are primed per MIL-PRF-23377, TYPE I, CLASS H, and painted per MIL-PRF-85285, TYPE I COLOR

NUMBER (26231), military gray (not lusterless variety) per FED-STD-595 (exceptions are bottom and connector surfaces are free of paint).

Human Factors

Human Engineering principles and criteria (including considerations for human capabilities and limitations) were used in alignment with MIL-STD-1472 in all phases of design, development, testing, and procedures development.

Electromagnetic Interference and Compatibility Test

MS18-A perform its intended function, and its operation does not degrade the performance of other equipment or subsystems. The MS18-A is designed and tested to meet the following requirements of MIL-STD-461F:

Table 3-1: Compatibility Test

Test	Description	
CE102	Conducted Emissions Power Leads	10kHz to 10MHz
CE106	Conducted Emissions Antenna Terminal	10kHz to 40GHz
CS101	Conducted Susceptibility Power Leads	30Hz to 150kHz
CS103	Conducted Susceptibility Antenna Port	Intermodulation, 15kHz to 10GHz
CS105	Conducted Susceptibility Antenna Port	Cross-Modulation, 30Hz to 20GHz
CS114	Conducted Susceptibility Bulk Cable Injection	10kHz to 200MHz
RE102	Radiated Emissions Electric Field	10kHz to 18GHz
RS103	Radiated Susceptibility Electric Field	2MHz to 18GHz
Indirect Lightning ⁽⁶⁾	Damped Sinusoidal transients	RF Leads, 10kHz to 100MHz
		Power Leads, 10kHz to 100MHz

⁽⁶⁾Note: For additional detail regarding Indirect Lightning, please contact GPS Source.

Electrical Power Service Conditions

The MS18-A is able to accommodate the +28VDC aircraft power. Consequently, it must perform its intended function when supplied with the Normal, Emergency and Starting Operation types of electrical power defined by MIL-STD-704F. The transfer operation, as defined by MIL-STD 704F, shall not change the operating mode or damage the MS18-A.

Table 3-2: MIL-STD-704F Test Requirements

Paragraph	Description
MIL-STD-704F, 5.3.2.0	DC Full Performance Characteristics, 28VDC system.
MIL-STD-704F, 5.3.2.1	Normal Operation
MIL-STD-704F, 5.3.2.2	Abnormal Operation
MIL-STD-704F, 5.3.2.3 and 5.3.2.4	DC Steady State Voltage in the Emergency or Starting Operation.

4 Shock

The MS18-A is designed to withstand the shock levels specified in the saw tooth shock pulse parameter specified in Figure 3-1 and Table 3-3. It is designed to meet the requirements of MIL-STD-810C Method 516.2 Proc. III.

Figure 3-1. Peak Shock Levels

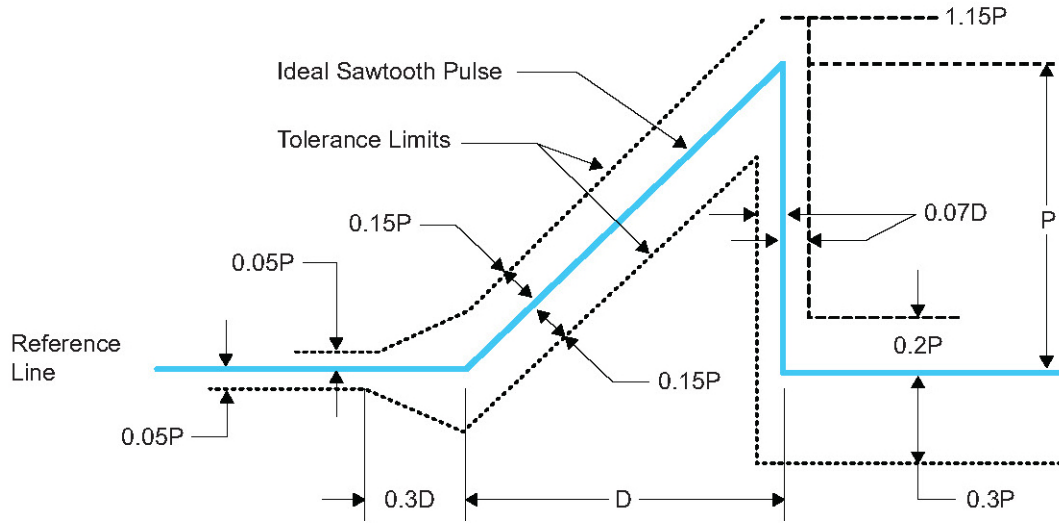


Table 3-3: Peak Shock Levels

Test	Flight Vehicle Equipment	
	Minimum Peak Value (P)	Nominal Duration (D)
Functional	20 g-force	11 ms
Crash Safety	40 g-force	11 ms

Vibration

The MS18-A is designed to meet the requirements of random vibration per conditions (MIL-STD-810C, Method 514.2, Procedure 1A) to the levels defined below. Acceleration Power Spectral Density (PSD) for the random vibration envelope is shown in Figure 3-2. Amplitudes for the functional levels and endurance level requirements are as shown in Table 3-4.

Figure 3-2: Zone 3 and 4 Broadband Random Vibration

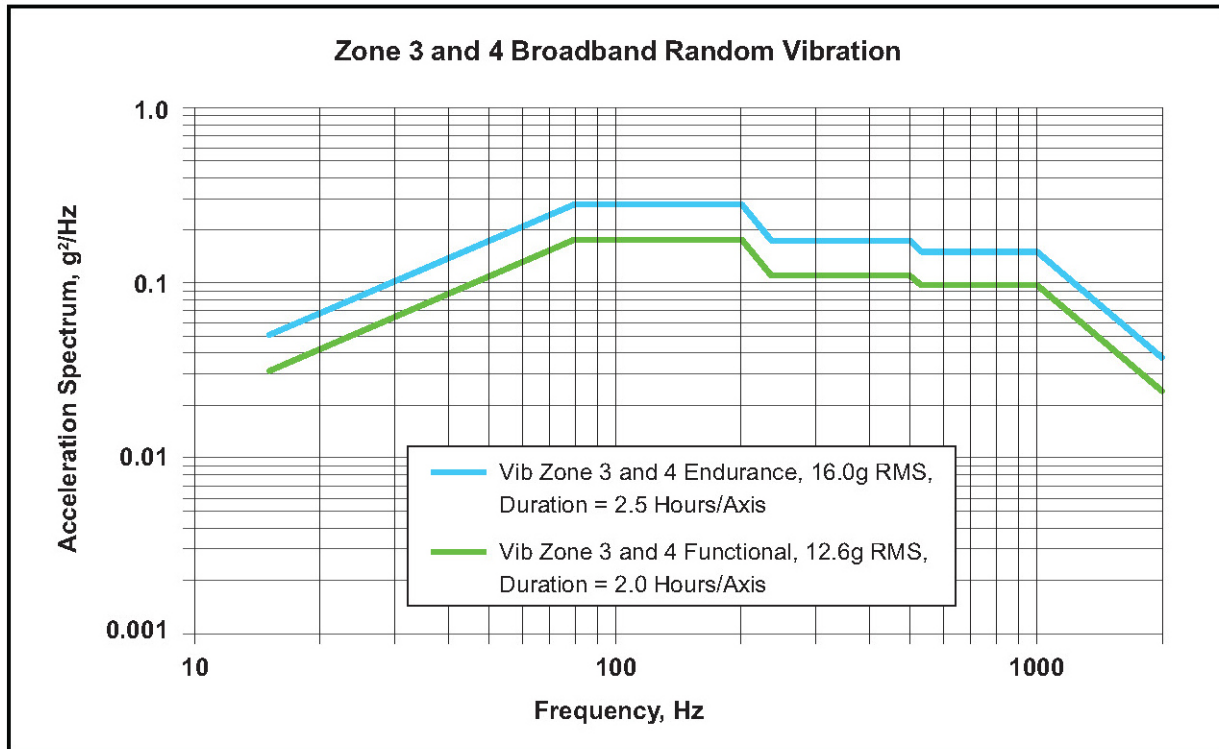


Table 3-4: Vibration Zone 3 and 4

Vibration Zone 3 and 4 Functional, 12.6g RMS Duration = 2 Hours/Axis	
Freq. Hz	g²/Hz
15	.0033
80	0.177
200	0.177
234	0.111
500	0.111
535	0.097
1000	0.097
2000	0.024

4 Product Options



Electrostatic Sensitive Device (ESD)

Remove electrostatic protection at use or in a protected area.
 Resuse packaging materials for the unserviceable item. See DOD-HDBK-263 for protective handling or testing measures for this item.

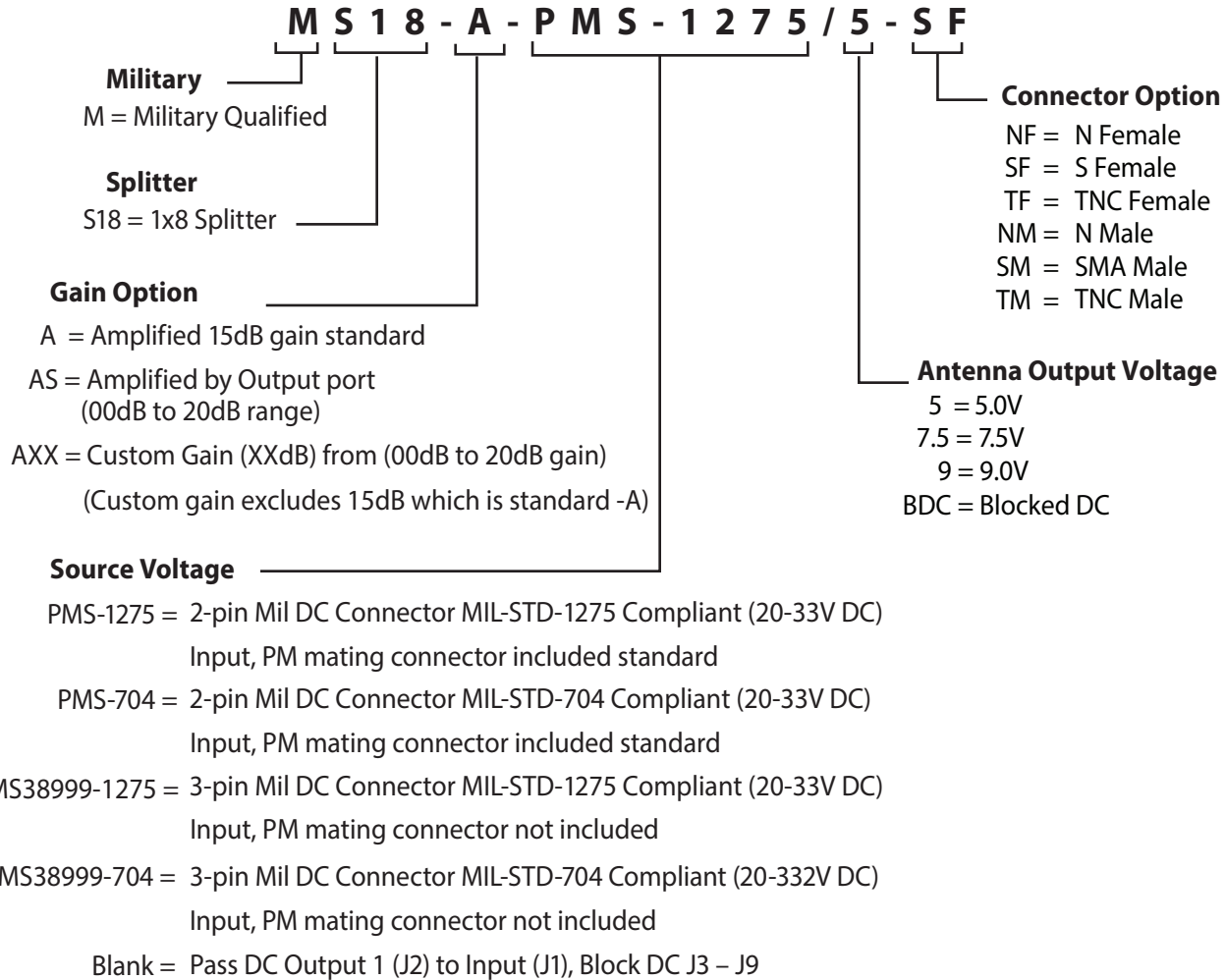
Table 4-1: MS18-A Available Options

Power Supply	
Source Voltage	Voltage Input
	DC 20-33VDC
Output Voltage	Type
	Military Style Connector
DC Voltage Out	
5.0, 7.5, 9.0, Block DC	
RF Connector	
Connector	Connector Type
	N (Female/Male)
	SMA (Female/Male)
	TNC (Female/Male)
Limitations	
N/A	
N/A	
N/A	
Port	
Pass DC ⁽¹⁾	Input passes inline bias voltage received on J2
DC Blocked	Standard configuration, J2,J3, J4,J5,J6,J7,J8,J9 DC Blocked with 200Ω resistive load to ground

Note 1: Input may be configured to Block DC via -S Special Configuration.

For assistance with non-standard or special configurations please contact GPS Source via phone (719-421-7300) or email GPSS-Sales@gd-ms.com

5 Product Code Decoder



Note: - \$75 each tethered load, call for help configuring correct port allocation

Note: To have product/part codes customized to meet exact needs, contact GPS Source at GPSS-Sales@gd-ms.com or visit the website at www.gpssource.com

GENERAL DYNAMICS

Mission Systems

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