

## ELECTRO-MECHANICAL CONTROLS COMMANDER & GUNNER HANDSTATIONS



### KEY FEATURES

- Precision motion control
- Robust assembly
- Controls consistently meet all operator requirements
- Proven manufacturing, testing and support capabilities
- Engineering development capabilities allow for design flexibility



« GUNNER HANDSTATION (GHS) »

Elbit America currently manufactures and overhauls Commanders, Gunners and Stabilized Commanders Weapon Station Controls for the Bradley Fighting Vehicle, Abrams Main Battle Tank and Stryker MGS Armored Fighting Vehicle. Our Team has significant experience in the design, assembly and test of Hydraulic and Electro-Mechanical Controls for the rigorous demands of military applications, successfully addressing such challenges as: integration, high reliability, severe endurance requirements and harsh environmental conditions.



« COMMANDER HANDSTATION (CHS) »

## ELECTRO-MECHANICAL CONTROLS COMMANDER HANDSTATIONS



### DESCRIPTION

The Commander's Handstation (CHS) is a multifunctional two axes hand controller used to command the rate of movement of the Line Of Sight (LOS) in the Improved Bradley Acquisition System (IBAS), the (LOS) in the Commander Independent Viewer (CIV), or the weapon the line of fire (LOF) in the Bradley M2A3/M3A3 vehicle.

The Commander Handstation Handstation consists of a single right hand grip assembly. All electronics are internal to this assembly. It contains the connectors through which all electrical interfaces to the M2A3/M3A3 system are made. The overall electronics communications architecture of the M2A3/M3A3 system is based on the MIL-STD-1553B Data Bus. The CHS will function as a remote terminal (RT) per MIL-STD-1553B.

The CHS contains 6 momentary switches, a 3-position toggle switch, and a cursor controller for the selection of different functions to be performed.



# ELECTRO-MECHANICAL CONTROLS

## COMMANDER HANDSTATIONS SPECS

TECHNICAL SPECIFICATIONS				
<b>POWER MIL-STD-1275</b>	50 Watt Max	28V Steady State		
<b>VOLTAGE INPUT</b>	28VDC	Max: 33.0 VDC, Min: 20.0 VDC		
<b>VOLTAGE RIPPLE</b>	+/- 2.0 p-p			
TEMPERATURE				
<b>HIGH</b>	Storage	160°F (71°C)		
	Operation	Continuously at 160°F (71°C) for 6 Hours		
<b>LOW</b>	Storage	-60°F (-51°C)		
	Operation	Demonstrate full performance at -51°F (-46°C)		
<b>COOLING</b>	Conduction (Cooling to the mounting flange)			
<b>MMBF/MTBF</b>	73,780 Hours / 5,902 Hours (Minimum)			
RESOLUTION		SIGNAL INTERFACE		
<b>HORIZONTAL DEFLECTION</b>	0 - 3.1 lbs. / 0 - 1.4 kg.	<b>J1</b>	38999/24WD19PA	Power, Cable Disconnect, & RT Address Lines
<b>VERTICAL DEFLECTION</b>	0 - 3.1 lbs. / 0 - 1.4 kg.	<b>J2</b>	12465065-1	MIL-STD-1553B
<b>AZIMUTH DEFLECTION</b>	0° - 57.5°	<b>J3</b>	12465065-2	MIL-STD-1553B
<b>PITCH DEFLECTION</b>	0° - 42.5°	<b>J4</b>	38999/24WD19PN	Interconnect/Discrete
MECHANICAL				
<b>WEIGHT</b>	< 15 lbs. Max / 6.8 kg. Max			
<b>ENVELOPE (L X W X H)</b>	8 in x 5 in x 11 in / .20 m x .13 m x .28 m			
<b>CONNECTORS</b>	MIL-C-38999 Series III			
<b>SWITCHES</b>	MIL-S-8805D Compliant			
ELECTRO-MAGNETIC INTERFERENCE/COMPATIBILITY (EMI/EMC)				
<b>EMI/EMC (MIL-E-6051)</b>				
<b>MIL-STD-461D</b>	Radiated Susceptibility	RS103		
	Conducted Susceptibility	CS101, CS114, CS115		
	Radiated Emission	RE102		
	Conducted Emission	CE102		
ENVIRONMENTAL (MIL-STD-810E)				
<b>IMMERSION</b>	3.3 ft / 1 m - 2 Hours			
<b>HUMIDITY</b>	85% - 95% (86°F to 140°F (30° to 60C°))			
<b>SALT FOG</b>	Compliant			
<b>DUST (MIL-PRF-8805/3)</b>	Compliant			
<b>ESD MIL-STD-1686</b>	Compliant			
<b>VIBRATION</b>	Method 514 Procedure I			

# ELECTRO-MECHANICAL CONTROLS

## COMMANDER HANDSTATIONS SPECS

SPECIAL FEATURES	
<b>NUCLEAR HARDENING</b>	Yes - USANCA
<b>BLOCK DIAGRAMS</b>	See diagram below
<b>BUILT IN TEST (BIT)</b>	Yes
<b>START UP BIT (SBIT)</b>	Communication
	Elevation and azimuth null output
	Verify supply voltages and voltage reference
	Verify discrete input and output response
	Electronically Erasable Programmable Read Only Memory (EEPROM): Compute and verify the EEPROM checksum
	Random Access Memory (RAM): write, read back and compare a memory test pattern
	Central Processing Unit (CPU): execute and verify basic arithmetic functions; verify timing, interrupt and chip select functions
<b>VIBRATION</b>	Method 514 Procedure I
<b>ESD (MIL-STD-1686)</b>	Compliant
<b>FUNCTIONAL SHOCK</b>	< 10.0 g's
<b>DMS (OBsolescence)</b>	Yes; Conducted every Qtr



## ELECTRO-MECHANICAL CONTROLS GUNNER HANDSTATION



### DESCRIPTION

The Gunner's Handstation (GHS) is a multifunctional two axes hand controller used to command the rate of movement of the Line Of Sight (LOS) in the Improved Bradley Acquisition System (IBAS), the (LOS) in the Gunner Independent Viewer (CIV), or the weapon line of fire (LOF) in the Bradley M2A3/M3A3 vehicle.

The Gunner Handstation consists of a left and right hand grip mounted on a yoke assembly. The yoke assembly contains the connectors through which all electrical interfaces to the M2A3/M3A3 system are made. The overall electronics communications architecture of the M2A3/M3A3 system is based on the MIL-STD-1553B Data Bus. The GHS will function as a remote terminal (RT) per MIL-STD-1553B.

The GHS contains momentary switches, 2-position and multiple-position toggle switches for the selection of different functions to be performed.





# ELECTRO-MECHANICAL CONTROLS

## GUNNER HANDSTATION SPECS

TECHNICAL SPECIFICATIONS			
POWER MIL-STD-1275	50 Watt Max	28V Steady State	
VOLTAGE INPUT	28VDC	Max: 33.0 VDC, Min: 20.0 VDC	
VOLTAGE RIPPLE	+/- 2.0 p-p		
TEMPERATURE			
HIGH	Storage	160°F (71°C)	
	Operation	Continuously at 160°F (71°C) for 6 Hours	
LOW	Storage	-60°F (-51°C)	
	Operation	Demonstrate full performance at -51°F (-46°C)	
COOLING	Conduction (Cooling to the mounting flange)		
MMBF/MTBF	73,780 Hours / 5,902 Hours (Minimum)		
RESOLUTION		SIGNAL INTERFACE	
HORIZONTAL DEFLECTION	0 - 3.1 lbs. / 0 - 1.4 kg.	J1	38999/24WD19PA Power, Cable Disconnect, & RT Address Lines
VERTICAL DEFLECTION	0 - 3.1 lbs. / 0 - 1.4 kg.	J2	12465065-1 MIL-STD-1553
AZIMUTH DEFLECTION	0° - 57.5°	J3	12465065-2 MIL-STD-1553
PITCH DEFLECTION	0° - 42.5°	J4	38999/24WD19PN Interconnect/Discrete
MECHANICAL			
WEIGHT	< 20 lbs. Max / 9.1 kg. Max		
ENVELOPE (L X W X H)	9.71 in X 10.43 in X 9.01 in / .25 m x .26 m x 0.23 m		
CONNECTORS	MIL-C-38999 Series III		
SWITCHES	MIL-S-8805D Compliant		
ELECTRO-MAGNETIC INTERFERENCE/COMPATIBILITY (EMI/EMC)			
EMI/EMC (MIL-E-6051)			
MIL-STD-461D	Radiated Susceptibility	RS103	
	Conducted Susceptibility	CS101, CS114, CS115	
	Radiated Emission	RE102	
	Conducted Emission	CE102	
ENVIRONMENTAL (MIL-STD-810E)			
IMMERSION	3.3 ft / 1 m - 2 Hours		
HUMIDITY	85% - 95% (86°F to 140°F (30° to 60C°))		
SALT FOG	Compliant		
DUST (MIL-PRF-8805/3)	Compliant		
ESD MIL-STD-1686	Compliant		
VIBRATION	Method 514 Procedure I		

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<b>BUILT IN TEST (BIT)</b>	Yes
<b>START UP BIT (SBIT)</b>	Communication
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	Electronically Erasable Programmable Read Only Memory (EEPROM): Compute and verify the EEPROM checksum
	Random Access Memory (RAM): write, read back and compare a memory test pattern
<b>VIBRATION</b>	Method 514 Procedure I
	Compliant
<b>ESD (MIL-STD-1686)</b>	Compliant
<b>FUNCTIONAL SHOCK</b>	< 10.0 g's
<b>DMS (OBSCOLESCENCE)</b>	Yes; Conducted every Qtr





SCWS GRIP



M1A1  
COMMANDER'S HANDLE



M1A2  
COMMANDER'S HANDLE



TCSH GRIP



M1 GUNNER'S CONTROL

**ESA MANUFACTURES TACTICAL AND SIMULATOR CONTROLS FOR M1 ABRAMS, STRYKER, LAV AND M60**



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