

“SPACE” RELAY BOOK

RELAYS for “SPACE” APPLICATIONS
manufactured under ESCC requirements



Worldwide Locations:

EPS-North America

Phone: (714) 736-7599

EPS-Asia Pacific

Phone: (852) 2 191 3830

EPS-Europe

Phone: (+33) 3 87 97 98 97



INTRODUCTION

- LEACH offers a wide range of hermetically sealed relays from 1Amp to 75Amps qualified to be used in Space programs.
- LEACH is a leader in Hi-Rel Relays since the first space launch and is a key supplier to virtually all major Space Programs.
- LEACH's ESCC qualified products are manufactured at two different facilities.
- The high performances of LEACH relays have been demonstrated by step stress testing.
- LEACH relays are Qualified for shocks and vibrations Survivability, for launch applications.
- LEACH Relays have Over-rated capabilities.
- The Customers feedback on Quality reaches the highest level " level : A"

"SPACE" PROCESS ACCEPTANCE

- LEACH relays for "SPACE" applications are manufactured as a unique batch. Same piece parts, full traceability and are built in the Hi-Rel production lines.
- All relays are serialized.
- 100% PRECAP inspected. Can be witnessed by a third party.
- 100% Final Production data, recorded (ATP).
- 100% screening and data are recorded. A % failure acceptance level is fixed.
- Lot Acceptance Test (LAT) is performed and data are recorded. Test can be witnessed by a third party.
- Additional Qualification / Acceptance test possibilities.
 - ✓ Survivability
 - ✓ Life test
 - ✓ DPA
 - ✓ RGA
 - ✓ MTUV
 - ✓ PIND
 - ✓ X-RAY
- Specific individual package.
- All data are provided on request (Possibility of "value drift" analysis).

LEACH QUALITY LEVEL FOR "SPACE" RATED RELAYS

The QUALITY of the relay is vital and starts at piece parts level.

- LEACH Quality System is certified MIL-STD-790, EN9100 and ESA-ESCC 20200-QA
- LEACH Product Construction has been approved by "ESCC Executive, ie ESA and CNES
- Relays have been subjected to a Performance Evaluation Test based on the requirements used in "SPACE" application and component limits have been determined.
- The Highest Quality of the Piece parts is used including and sub-assemblies.
- A Hi-Rel process as per PID (Process Identification Document) is used – process flow, cleaning, welding, out-gassing, clean rooms, along with high skilled assemblers & operators.

LEACH Europe relay's pedigree is worldwide

CUSTOMER	APPLICATION	PROGRAM	YEAR
Matra Marconi Space (France / U.K.)	Satellites	Skynet-4 A.. / Inmarsat-.. / Hot Bird-4&5 / Spot 1...5 / Astra 1... / Skybridge / Helios 1... / Metop / Nilesat /	1980
EADS Astrium ST (ex Matra Marconi ex BAe, ex Dornier)	Launchers	Ariane 4 & Ariane 5	1980
DASA & Aerospatiale- (Germany - France)	Satellites	Turksat / Sinosat / Meteosat / Arabsat / Eutelsat...	1990
Alenia Spazio (Italy)	Satellites	Artemis (Italsat-3000 Bus)	1998
Alcatel Space	Satellites	Hispasat (Spacebus-3000B2)	2000
EADS Astrium (ex Matra Marconi ex Bae, ex Dornier)	Satellites	Satellites using EUROSTAR 1000, 2000 & 3000 platforms and others (ASTRA, EUTELSAT, INMARSAT, SKYNET, COMS-1, etc.)	2000
Thales Alenia Space (ex Alcatel Space ex Aerospatiale)	Satellites	Satellites using Space bus 3000 & 4000 platforms and others (EUTELSAT, KOREASAT, CHINASAT, YAMAL, etc.)	2000
SSTL & OHB	Satellites	Galileo, etc.	2009
VSSC (India)	Launch vehicles	PSLV, GSLV	1998
ISRO (India)	Satellites	Several	2000
CAST (China)	Satellites	Several	2000
Northrop Grumman Space (ex TRW)	Satellites	Several	2005
Space Systems LORAL (US)	Satellites	Several	2011
NEC Toshiba Space (Japan)	Satellites	Hayabusa 2	2010
Several sub-contractors like: EREMS / SITAEL / APCON / ASTRO / ASP / COMDEV / DSI / L3-Com / MALIN SPACE / SELEX GALILEO / TESAT /etc.	Satellites	Equipments for Satellites (latest examples: KOMPSAT-3 for KARI / TET-1 / EnMAp / Earthcare, SAOCOM, exomars, etc.	1980



**Recently, Helios 1 was retired.
Helios 1 was launched in 1995 by Ariane 4.**

The following LEACH relay series were fitted on Helios 1:
GP2, GP3A (now FD302), E, D, GP5 and M502.

LEACH EUROPE - ESCC relays

Relay Type	ESCC spec number	LEACH SERIES	Comments
Non-latch, 28Vdc, 10A, 2PDT	3601/001	M300	ESCC spec cancelled. Replaced by 3601/007
Non-latch, 28Vdc, 2A, 2PDT	3601/003	GP5	ESCC Qualified in 1978
Non-latch, 28Vdc, 15A, 2PDT	3601/007	M300H	ESCC Qualified in 2012
Non-latch, 28Vdc, 25A, 3PDT	3601/009	M500	/
Non-latch, 28Vdc, 1A, 2PDT	3601/012	E	ESCC Qualified in 1997
Latch, 28Vdc, 10A, 2PDT	3602/001	M302	ESCC spec cancelled. Replaced by 3602/009
Latch, 28Vdc, 2A, 2PDT	3602/003	GP2	ESC Qualified in 1979
Latch, 28Vdc, 15A, 4PDT	3602/004	M402H	ESCC Qualified in 2012
Latch, 50Vdc, 10A, GP3A	3602/005	GP3A	Obsolete / Replaced by FD302
Latch, 28Vdc, 25A, 3PDT	3602/006	M502***560	/
Latch, 28Vdc, 15A, 2PDT	3602/009	M302H	ESCC Qualified in 2011
Latch, 50Vdc, 2A, 2PDT	3602/010	GP250	ESCC Qualified in 1982
Latch, 28Vdc, 1A, 2PDT	3602/019	D	ESCC Qualified in 1997

ALTERNATIVE LEACH EUROPE “SPACE” grade relays

List of LEACH “SPACE” grade relays not on ESCC due to non-existing ESCC spec. At LEACH, these relays are following the same rules than the ESCC qualified relays with, Hi-Rel manufacturing, PRECAP inspection, final production, screening and LAT testing.

Relay Type	LEACH spec number	LEACH SERIES	Comments
Non-latch, 28Vdc, 5A, 2PDT	ST117800	M210	
Non-latch, 28Vdc, 5A, 4PDT	ST097500	M220	
Non-latch, 28Vdc, 10A, 3PDT	ST120800	M230	
Non-Latch, 28Vdc, 15A, 4PDT	ST1076915	M400H	
Latch, 28Vdc, 5A, 2PDT	ST117900	M212	
Latch, 50Vdc, 10A, 1NO, 1NC	ST1081128	FD302	Replaces the GP3A

PART NUMBER SPECIFIC SYSTEM for “SPACE RATED” RELAYS

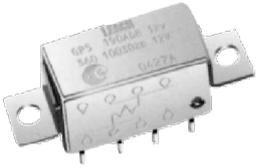
- Drawing -460-** for ESCC qualified relays
- Drawing -560 to 564 for the other relays where ESCC is not requested or where no ESA spec does exist. These relays follow the same rules than the QPL parts.
- Drawing -254 for U.S. factory specific space screening.

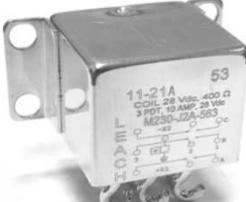
PRODUCT OVERVIEW

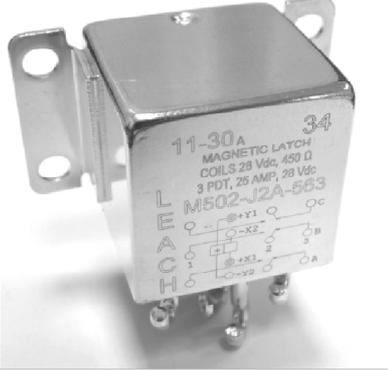
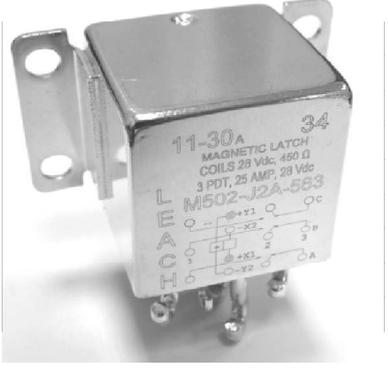


Shown relays are at true size view using 10mm x 10mm scale

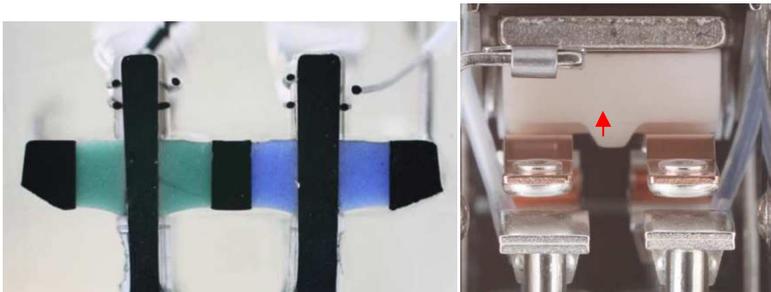


Relay series	Ratings	View	Body size, Max (mm)	Weight Typical
E	Non-latch, 2PDT 28Vdc, 1A, 100 000 cycles		12.8 x 6 x 10.4	2,7 g
D	Latch, 2PDT 28Vdc, 1A, 100 000 cycles		12.8 x 6 x 10.4	2,7 g
GP5	Non-latch, 2PDT 28Vdc, 2A, 100 000 cycles		20.4 x 10.2 x 10.4	8 g
GP2	Latch, 2PDT 28Vdc, 2A, 100 000 cycles		20.4 x 10.2 x 10.4	8 g
GP250	Latch, 2PDT 50Vdc, 2A, 100 000 cycles		20.4 x 10.2 x 10.4	8 g
M210	Non-latch, 2PDT 28Vdc, 5A 100 000 cycles		20.6 x 10.4 x 16.3	14,5 g
M212	Latch, 2PDT 28Vdc, 5A 100 000 cycles		20.6 x 10.4 x 16.3	15 g

<p>M220</p>	<p>Non-latch, 4PDT 28Vdc, 5A 100 000 cycles</p>		<p>20.6 x 20.6 x 16.3</p>	<p>25 g</p>
<p>M230</p>	<p>Non-latch, 3PDT 28Vdc, 10A 50 000 cycles</p>		<p>20.6 x 20.6 x 16.3</p>	<p>25 g</p>
<p>M300 (H)</p>	<p>Non-latch, 2PDT 28Vdc, 10A (15A) 100 000 cycles</p>		<p>26 x 13.1 x 25.7</p>	<p>35 g</p>
<p>M302 (H)</p>	<p>Latch, 2PDT 28Vdc, 10A (15A) 100 000 cycles</p>		<p>26 x 13.1 x 25.7</p>	<p>37 g</p>
<p>M400 (H)</p>	<p>Non-latch, 4PDT 28Vdc, 10A (15A) 100 000 cycles</p>		<p>26 x 26 x 25.7</p>	<p>60 g</p>

<p>M402 (H)</p>	<p>Latch, 4PDT 28Vdc, 10A (15A) 100 000 cycles</p>	 <p>A silver-colored magnetic latch relay with a rectangular body and mounting tabs. The top surface is engraved with technical specifications: '10-51A MAGNETIC LATCH COIL 28 VDC, 300 Ω 4 PDT, 15 AMP, 28 VDC M402-D2AA-H-450-00'. A wiring diagram is also visible on the top surface. A small blue circular logo is present in the bottom-left corner of the image area.</p>	<p>26 x 26 x 25.7</p>	<p>63 g</p>
<p>FD302</p>	<p>Latch, 1NC + 1NO 50Vdc, 10A 100 000 cycles</p>	 <p>A silver-colored magnetic latch relay with a rectangular body and mounting tabs. The top surface is engraved with technical specifications: 'LEACH MAGNETIC LATCH COILS 12 VDC, 150 Ω 1 DB, 10 AMP, 55 VDC FD302-D2B-560'. A wiring diagram is also visible on the top surface.</p>	<p>26 x 13.1 x 25.7</p>	<p>35 g</p>
<p>M500</p>	<p>Non-latch, 3PDT 28Vdc, 25A 50 000 cycles</p>	 <p>A silver-colored magnetic latch relay with a rectangular body and mounting tabs. The top surface is engraved with technical specifications: '11-30A 34 MAGNETIC LATCH COILS 28 Vdc, 450 Ω 3 PDT, 25 AMP, 28 Vdc M502-J2A-563'. A wiring diagram is also visible on the top surface.</p>	<p>26 x 26 x 25.7</p>	<p>65 g</p>
<p>M502</p>	<p>latch, 3PDT 28Vdc, 25A 50 000 cycles</p>	 <p>A silver-colored magnetic latch relay with a rectangular body and mounting tabs. The top surface is engraved with technical specifications: '11-30A 34 MAGNETIC LATCH COILS 28 Vdc, 450 Ω 3 PDT, 25 AMP, 28 Vdc M502-J2A-563'. A wiring diagram is also visible on the top surface.</p>	<p>26 x 26 x 25.7</p>	<p>67 g</p>
<p>KXDL</p>	<p>Latch, 1PST/NO + 1 PDT 28Vdc, 75A 20 000 cycles 150Amp carry capabilities</p>	 <p>A black magnetic latch relay with a rectangular body and mounting tabs. The top surface features two large screw terminals and a wiring diagram. The text 'LEACH INTERNATIONAL PORTLAND, OREGON' is visible on the top surface.</p>	<p>26 x 26 x 25.7</p>	<p>100g max</p>

“SPACE” DESIGN & PRODUCT TECHNOLOGY

<p>Hermetic sealed design – Glass to Metal seals</p> <p>Ceramic contact isolation bloc – No degassing, good heat dissipation of contact moving blades</p>	 <p>Cross sectional view terminals through the glass seals</p> <p>Ceramic bloc</p>
<p>All welded construction – spot welding, laser welding or electron beam welding</p>	
<p>Relay body and terminals are Tin-Lead plated to avoid tin whickers growth</p>	
<p>Balanced armature design, allows a compact and powerful construction</p>	