

Worldwide Manufacturer of Relays



ESA Space Passive Symposium

«Hi-Rel Electromechanical Relays for Space Applications»

September 24th-26th, 2013 - Noordwijk

Andre SMRKOLJ – STPI Space Division - Marketing Mgr



Worldwide Manufacturer of Relays

STPI
GROUP



100% FRENCH GROUP

5 factories worldwide

500 people

One Factory 100% dedicated to the Space Industry: REL

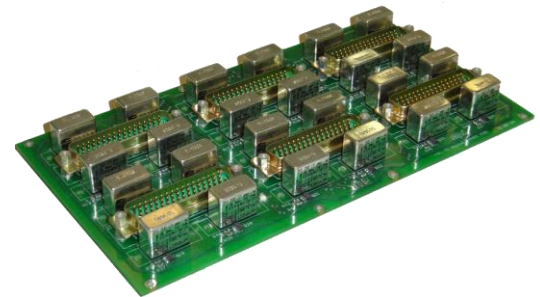
Quality system: ISO-AS-EN MIL / ESA / CECC



MAIN PRODUCTS



- Hermetically Sealed Relays
- Time Delay / Function Relays
- Airborne Systems
- Railways Systems & Automatism
- Solid State Switching and Integration
- Sockets (solder / sealed / faston lugs)



RELAYS

Non Latching Relays

- 1A to 50A
- SPDT to 6PDT

Latching Relays

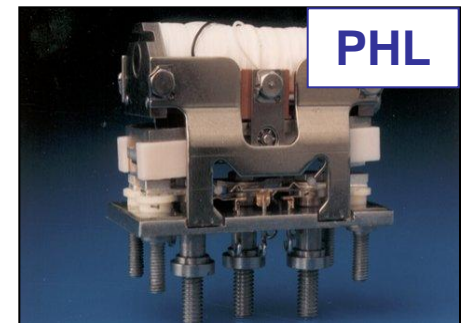
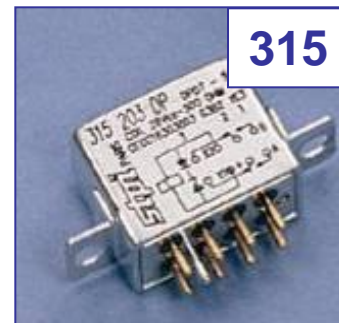
- 1A to 50A
- SPDT to 4PDT

Solid State Timers

- Time delay on operate
- Time delay on release
 - Monostable timer

Time Delay Relays

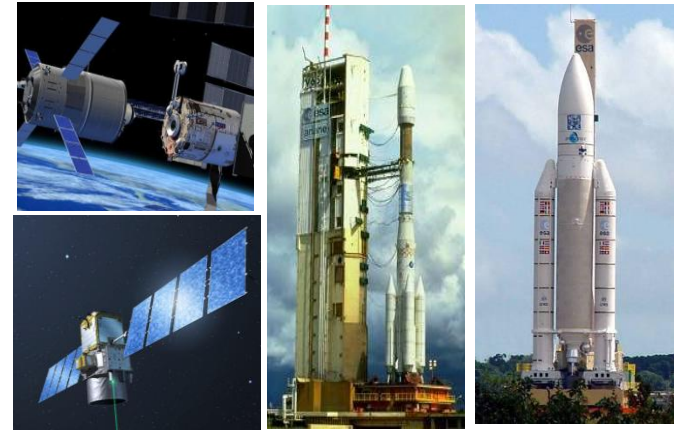
- Time fixed
- Time ajustable by external resistor
 - Time programmable



AERONAUTICS



SPACE



RAILWAYS



DEFENSE





The Space Industry requires the best technology

REL Orléans - France

REL

Orléans – France

60 persons

3500 m²

Activities:

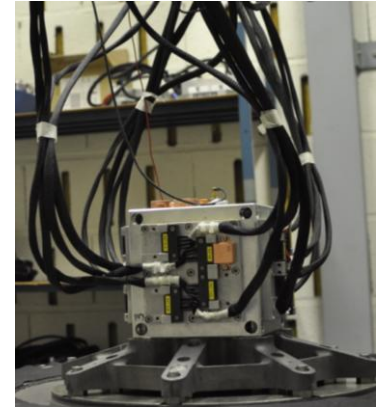
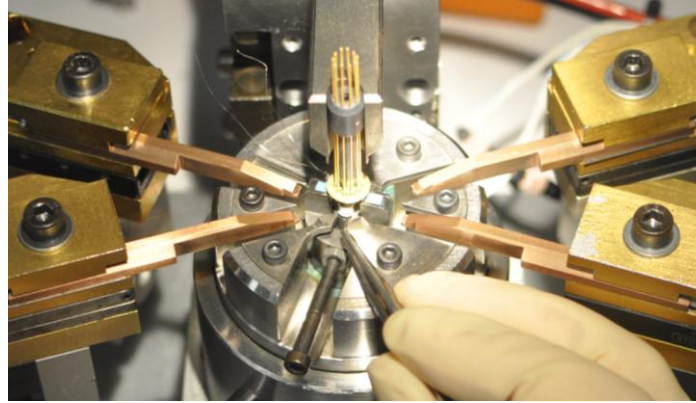


- High performance relays for space applications
- Design, development and production of Specific Relays
- Time delay relays and Airborne systems

Range: From 1Amps to 50Amps

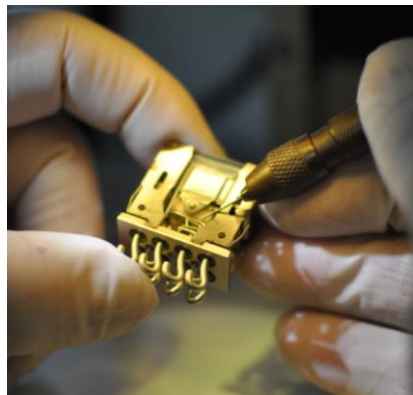


- STPI Space Division based in Orleans, France, supplies relays to the space industry since more than 40 years
- A State of the Art factory dedicated to the Space industry with:
 - high precision assembly operations
 - clean room facilities
 - a full range of testing capabilities
 - an experienced management team
 - a continuous development of highly skilled workforce
- A complete range of latching and non-latching relays between 1 to 50 Amp



A State of the Art Factory with:

- Controlled environment
- Specialized equipment
- 100% individual screening capacity
- MIL STD 790 & Space Qualified by ESA / CNES

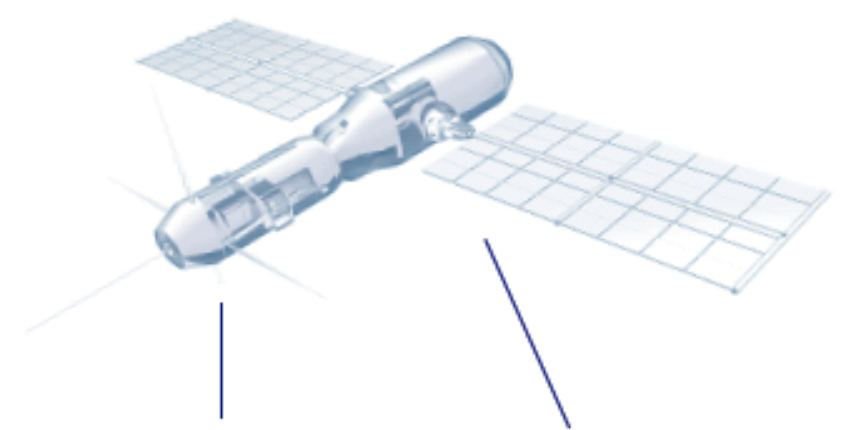


Launcher

- Inertial Reference System
- On Board Computers
- Power Control Units
- Stage Separation Interface
- Satellite Control System
- Telemeasure System
- Safety System

STPI References :

**T, E215, EL215,
EL415, 310,
311, 320**



Satellite Payload

- Specific Equipments
- HF / RF Equipments

STPI References :

**T, TL, EL215,
EL 415,
PHL50**

Platform - Bus

- Power Supply
- Battery Switching
- Power & Conditioning Distribution Unit
- Heating Control
- Solar Panels Control

STPI References :

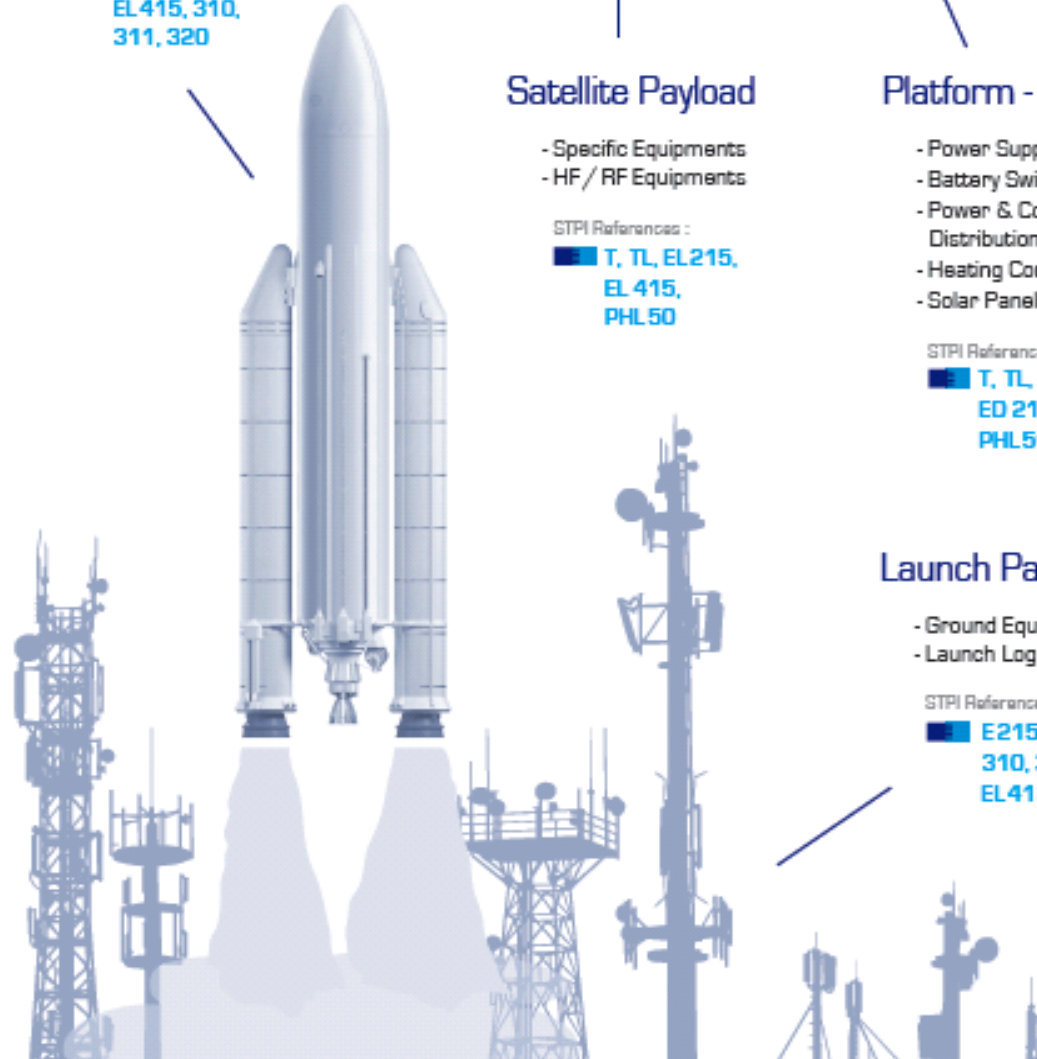
**T, TL, EL215,
ED 215, EDL 215
PHL50**

Launch Pad

- Ground Equipments
- Launch Logistics









STPI References :

**E215, EL215,
310, 310B, 320B,
EL415**






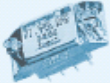








RELAYS USED FOR SPACE LAUNCHER & SATELLITE APPLICATIONS

NON LATCHING RELAYS

Rating & Arrangement	Can Size	Serie	Design	Application Reference
1 Amp - 2PDT	T05	T		 ESA QPL Specification ESCC 3601 002
2 Amp - 2PDT	½ Cristal	310/311		Customer Launcher Specification
2 Amp - 4PDT	Cristal	320		Customer Launcher Specification
5 Amp - 2PDT	1/5 Inch ³	E 205		Customer Space Specification
10/15 Amp - 2PDT	½ Inch ³	E 215		 ESA QPL Specification ESCC 3601 007
15 Amp - 2PDT - DB	1 Inch ³	ED 215		Customer Space Specification
15 Amp - 4PDT	1 Inch ³	E 415		Customer Space Specification

RELAYS USED FOR SPACE LAUNCHER & SATELLITE APPLICATIONS

LATCHING RELAYS

Rating & Arrangement	Can Size	Serie	Design	Application Reference
1 Amp - 2 PDT	T05	TL		 ESA GPL Specification ESCC 3602 002
2 Amp - 2 PDT	½ Cristal	310B		Customer Launcher Specification
2 Amp - 4 PDT	Cristal	320B		Customer Launcher Specification
5 Amp - 2 PDT	1/5 Inch ³	EL 205		Customer Space Specification
10/15 Amp - 2 PDT	½ Inch ³	EL 215		 ESA GPL Specification ESCC 3602 009
15 Amp - 2 PDT - DB	1 Inch ³	EDL 215		Customer Space Specification
15 Amp - 4 PDT	1 Inch ³	EL 415		 ESA GPL Specification ESCC 3602 004
25 Amp - 3 PDT Option: + auxiliary contact	1 Inch ³	EL 325		Customer Launcher Specification
50 Amp - SPDT - DB + aux.	2,75 Inch ³	PHL		Customer Space Specification ESCC 3602 014





Types covered by similarity: Rated Coil Voltages 5, 6, 9, 12 and 18 Vdc		Remarks:	
Procurement Specifications		Manufacturer	
Generic ESCC 3601	REL-STPI St Jean de la Ruelle France	Qualification	CNES
Detail ESCC 3601/002		Extension	CNES
Characteristics: Variants 01 to 06 are qualified		Extension	CNES
Contact Rating 1A at 28Vdc		Extension	CNES
Contact Configuration 2PDT		Re-qualification	CNES
Package Type TO-5 Can			
Coil Voltage 5 - 26.5 Vdc			
Operating Temperature Range (°C): -65 to +125			
Current Validity of Qualification		Page	
Certificate 102 E		Valid Until 09-01	
October 2011		001	
Types covered by similarity: Rated Coil Voltages 5, 6, 9, 12 and 18 Vdc			
Procurement Specifications			
Generic ESCC 3602	REL-STPI St Jean de la Ruelle France	Qualification	CNES
Detail ESCC 3602/002		Extension	CNES
Characteristics: Variants 01 to 06 are qualified		Extension	CNES
Contact Rating 1 A at 28 Vdc		Extension	CNES
Contact Configuration 2 PDT		Re-qualification	CNES
Package Type TO-5 Can			
Coil Voltage 26.5 Vdc			
Operating Temperature Range (°C): -65 to +125			
Current Validity of Qualification		Page	
Certificate 88 F		Valid Until 09-02	
January 2012		001	

Parameter	Non Latching Version	Latching Version
Specification	ESCC 3601-002	ESCC 3602- 002
Housing	TO5	TO5
Contact arrangement	2PDT	2 PDT
Rating (100 000 operations)	1 Amp /28 V	1 Amp /28 V
Overload (100 opérations)	2 Amps	2 Amps
Temperature range	-65°C/+125°C	-65°C/+125°C
Vibration	30g / 3000 Hz	30g / 3000 Hz
Shock	100g /6ms	100g /6ms






Types covered by similarity: Coil Voltage 12 Vdc		Remarks:	
Procurement Specifications		Manufacturer	
Generic ESCC 3601		REL STPI St Jean de la Ruelle France	
Detail ESCC 3601/007		Nature of Approval	
Generic ESCC 3602		Supervising Authority	
Detail ESCC 3602/009		Date	
Types covered by similarity: Coil voltage : 12		Qualification	
Procurement Specifications		Extension	
Generic ESCC 3601		Merge	
Detail ESCC 3601/007		Re-qualification	
Characteristics: Variants 03, 04 and 06 are qualified		CNES	
Contact Rating 15 A at 28 Vdc		CNES	
Contact Configuration 2 PDT		CNES	
Package Type Half cubic inch can		CNES	
Coil Voltage 12 and 28 Vdc		CNES	
Operating Temperature Range (°C): '65 to *125		CNES	
Current Validity of Qualification		Page	
Certificate		Valid Until	
205 C		December 2012	
09-01		004	
		RELAY, NON-LATCHING, ELECTROMAGNETIC, TYPE E 215	
Contact Rating 15 A at 28 Vdc Contact Configuration 2PDT Package Type Half-cubic inch can Coil Voltage 28 Vdc Operating Temperature Range (°C): '65 to *125			
		RELAY, LATCHING, ELECTROMAGNETIC, TYPE EL 215	
Current Validity of Qualification		Page	
Certificate		Valid Until	
167 D		October 2012	
09-02		004	

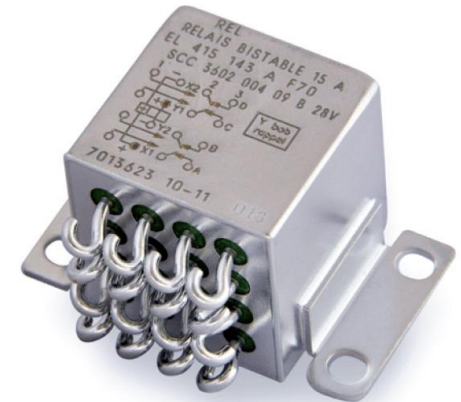
Parameter	Non Latching Version	Latching Version
Specification	ESCC 3601-007	ESCC 3602-009
Housing	½ Inch ³	½ Inch ³
Contact arrangement	2PDT	2 PDT
Rating (100 000 operations)	15 Amp /28 V	15 Amp /28 V
Overload (100 opérations)	40 Amps (dc)	40 Amps(dc)
Temperature range	-70°C/+125°C	-70°C/+125°C
Vibration	30g / 3000 Hz	30g / 3000 Hz
Shock	200g /6ms	200g /6ms





Types covered by similarity: Coil voltage : 12 Vdc		Remarks:					
Procurement Specifications		Manufacturer		Nature of Approval	Supervising Authority	Date	
Generic ESCC	3602	REL STPI St Jean de la Ruelle France		Qualification	CNES	Nov 1982	
Detail ESCC	3602/004			Extension	CNES	Dec 1985	
				Extension	CNES	Nov 1989	
				Extension	CNES	Jan 1994	
				Re-qualification	CNES	Apr 2011	
Characteristics: Variants 04, 06 and 09 and 14, 16 and 19 are qualified							
Contact Rating 15 A at 28 Vdc							
Contact Configuration 4PDT							
Package Type Cubic inch can							
Coil Voltage 28 Vdc							
Operating Temperature Range (°C): -65 to +125							
		RELAY, LATCHING, ELECTROMAGNETIC, TYPE EL 415			Current Validity of Qualification		Page
					Certificate	Valid Until	09-02
				98 E	April 2013	003	

Parameter	Latching Version
Specification	ESCC 3602-004
Housing	1 Inch ³
Contact arrangement	4 PDT
Rating (100 000 operations)	15 Amp /28 V
Overload (100 opérations)	40 Amps(dc)
Temperature range	-70°C/+125°C
Vibration	30g / 3000 Hz
Shock	200g /6ms





Parameter	Latching Version
Specification	ESCC 3602-014
Housing	2,75 Inch ³
Contact arrangement	SPDT –DB + Auxiliary contact
Rating (100 000 operations)	50 Amp /28 V
Rating (50 000 operations)	75 Amp/28 V
Rating (20 000 operations)	50 Amp/50 V
Overload (100 operations)	150 Amps(dc)
Temperature range	-70°C/+125°C
Vibration	30g / 2000 Hz
Shock	100g /11ms

Example of Applications

Satellite	Operated by	Launch Date	Launcher	Satellite	Operated by	Launch Date	Launcher
Inmarsat-2 F1	Inmarsat	30/10/1990	Delta 2	Hot Bird 8	Eutelsat	04/08/2006	Proton
Inmarsat-2 F2	Inmarsat	08/03/1991	Delta 2	Arabsat 4B	Arabsat	09/11/2006	Proton
Inmarsat-2 F3	Inmarsat	16/12/1991	Ariane 4	Skynet 5A	Paradigm	11/03/2007	Ariane 5
Telecom 2A	France Telecom	16/12/1991	Ariane 4	Anik F3	Telesat	09/04/2007	Proton
Inmarsat-2 F4	Inmarsat	15/04/1992	Ariane 4	Skynet 5B	Paradigm	14/11/2007	Ariane 5
Telecom 2B	France Telecom	15/04/1992	Ariane 4	Skynet 5C	Paradigm	12/06/2008	Ariane 5
Hispasat 1A	Hispasat	10/09/1992	Ariane 4	Badr-4	Arabsat	08/07/2008	Ariane 5
Hispasat 1B	Hispasat	22/07/1993	Ariane 4	Inmarsat-4 F3	Inmarsat	18/08/2008	Proton
Orion-1/Telstar 11	Orion/Loral	29/11/1994	Atlas 2A	Nimiq 4	Telesat	19/09/2008	Proton
Telecom 2C	France Telecom	06/12/1995	Ariane 4	Astra 1M	SES	05/11/2008	Proton
Telecom 2D	France Telecom	08/08/1996	Ariane 4	Hot Bird 9	Eutelsat	20/12/2008	Ariane 5
Hot Bird 2	Eutelsat	21/11/1996	Atlas 2A	Hot Bird 10	Eutelsat	12/02/2009	Ariane 5
Hot Bird 3	Eutelsat	02/09/1997	Ariane 4	Amazonas 2	Hispasat	01/10/2009	Ariane 5
Hot Bird 4	Eutelsat	28/02/1998	Ariane 4	Astra 3B	SES	21/05/2010	Ariane 5
Nilesat 101	Nilesat	28/04/1998	Ariane 4	Badr-5	Arabsat	03/06/2010	Proton
ST-1	SingTel/CHT	25/08/1998	Ariane 4	Arabsat 5A	Arabsat	26/06/2010	Ariane 5
Hot Bird 5	Eutelsat	09/10/1998	Atlas 2A	Ka-Sat	Eutelsat	26/12/2010	Proton
Afristar	WorldSpace	28/10/1998	Ariane 4	Yahsat 1A	Yahsat		
Asiastar	WorldSpace	21/03/2000	Ariane 5	Astra 1N	SES		
Nilesat 102	Nilesat	17/08/2000	Ariane 4	Yahsat 1B	Yahsat		
Eutelsat W1	Eutelsat	06/09/2000	Ariane 4	Express AM4	RSCC		
Astra 2B	SES Astra	14/09/2000	Ariane 5	Arabsat 5C	Arabsat		
Hot Bird-7	Eutelsat	11/12/2002	Ariane 5	Badr-7	Arabsat		
Hellas-Sat	Hellas-Sat	13/05/2003	Atlas V	Atlantic Bird 7	Eutelsat		
Worldstar 3	WorldSpace	(in storage)		Astra 2E	SES		
Eutelsat W3A	Eutelsat	15/03/2004	Proton	Astra 2F	SES		
Intelsat 10-02	Intelsat	16/06/2004	Proton	Astra 2G	SES		
Amazonas 1	Hispasat	05/08/2004	Proton	Astra 5B	SES		
Inmarsat-4 F1	Inmarsat	11/03/2005	Atlas V	Skynet 5D	Paradigm		
Anik F1R	Telesat	09/09/2005	Proton	SES-6	SES		
Inmarsat-4 F2	Inmarsat	08/11/2005	Sea Launch	W5A	Eutelsat		
Arabsat 4A	Arabsat	28/02/2006	Proton				



437,7 cumulated operating years



1,6 10⁹ HxRelays with 0 reported failure



STPI Space Division offers:

- ESA qualified relays
- Long Space Heritage
- Proven High Reliability
- ITAR free products

We will be pleased to support your Space or Hi-Rel projects

Thank you for your attention!

