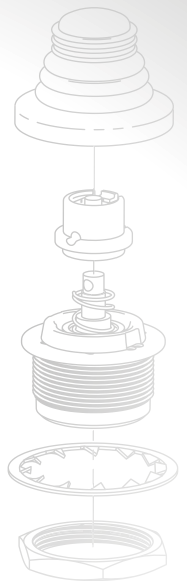
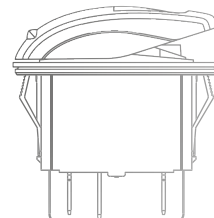
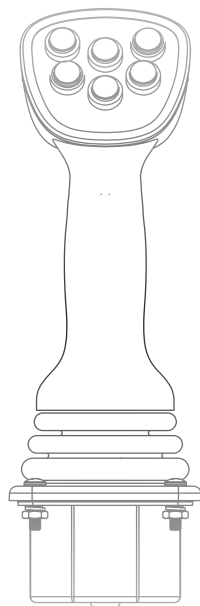
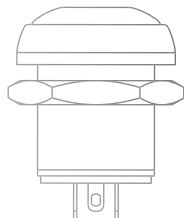




DEFENCE GROUND EQUIPMENT



CREATING GLOBAL
HMI SOLUTIONS

APEM IN DEFENCE GROUND EQUIPMENT

APEM is a leading manufacturer of **high-reliability human machine interface (HMI) products** with more than **65 years' experience in the defence industry.**

Vertically integrated, APEM offers its military customers uncompromised reliability through its custom product development, manufacturing excellence and outstanding service.

APEM offers a broad range of military-grade HMI components, including pushbutton and toggle switches, indicators and joysticks for military ground equipment applications.

FIELD PROVEN
RELIABILITY

UNPARALLELED
EXPERIENCE



FROM STAND-ALONE MIL-GRADE COMPONENTS TO FULLY CUSTOMISED ASSEMBLIES

APEM OFFERS 3 LEVELS OF INTEGRATION *

① COTS (COMMERCIAL OFF THE SHELF) AND CUSTOMISED COMPONENTS*

TOGGLE SWITCHES	PUSHBUTTON SWITCHES	ROCKER SWITCHES	PCB SWITCHES	LED INDICATORS	JOYSTICKS	THUMBSTICKS	THUMBWHEELS	KEYBOARDS
MIL-DTL-3950 QPL and more	Ice, sand and mud resistant, illuminated or not	Innovating locking system	Robust and MIL-PRF-22885H	NVIS compatible				
								

② INTEGRATED CONTROL PANELS*



PERFORMANCE - APEM has the ability to deliver fully integrated front panel solutions ensuring performance to mechanical, electrical, environmental and EMC/EMI standards.

EFFICIENT INTEGRATION - APEM can design electronics and connector systems to fit most applications. Low profile designs are possible as most APEM components are less than 16mm behind the panel.

③ Capability to add ELECTRONICS and SOFTWARE functions*



COMMUNICATION PROTOCOLS
CAN, RS485, RS422, USB...

INTEGRATED BOOT LOADER
Diagnostic and software upgrade capability

MIL-GRADE ELECTRONICS AND SOFTWARE DESIGN

LOW POWER

BIT SOFTWARE
Real time Built-In-Test

FILTERING & PROTECTION
ESD, EMI, filter and protection of network...

INTEGRATED DIMMING

OUR PRODUCTS

APEM RELIABILITY

- 65 YEARS EXPERIENCE IN MILITARY HMI PRODUCTS
- VERTICALLY INTEGRATED
- PRODUCT DESIGNS AND QUALIFICATIONS BASED ON MIL STD 810, 1472 AND 461
- MILITARY PRODUCTS ARE 100% TESTED
- QPL PRODUCTS (MIL-DTL-3950 AND MIL-DTL-83731)
- CECC QUALIFIED PRODUCTS (CECC 96201 & 96401)
- NATO MANUFACTURER CODE F7507




WHETHER IT'S A STANDARD PRODUCT OFFERING OR A CUSTOMISED SOLUTION, LET APEM PUT ITS DECADES OF DEFENCE EXPERIENCE TO WORK FOR YOU


PANEL SWITCHES

	12000X778 Series 6 CECC and MIL QPL toggle
	3500 Series 7 Toggle for demanding applications
	13000X778 Series 8 High reliability pushbutton
	IA/IP/IX/IZ Series 9 Low profile pushbutton
	MSG AND 90 Series 10 Switchguard to secure critical functions
	SEALING BOOTS 11 Additional sealing barrier
	MT Series 12 Selector switch for ergonomic interface
	KR AND KL Series 13 Customisable rocker switch
	ES AND 13000 Series 14 Metal emergency stop for extreme conditions

PCB SWITCHES

	MULTIMEC 5 Series 15 Available with NVIS LED Large selection of standard accessories
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INDICATORS

	QRM Series 16 Rear mount NVIS indicator
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JOYSTICKS

	HR/TW/CW Series 17 Robust thumbwheel
	NV Series 18 Navigator switch for easy and accurate menu selection
	TS Series 19 Intuitive method of control
	IP DESKTOP Series 20 Desktop controller for video surveillance
	3000 Series 21 Robust for military applications
	FG Series 22 Rugged operation for high vibration applications
	XD Series 23 Robust and compact

CONTROL PANELS

	RUGGEDIZED KEYBOARD 24 Product for a toughest environment
	KP6 CANBUS Series 25 Standard solution for multiple button applications
	BEZEL KEYBOARD 26 Thin & backlit

CUSTOM CAPABILITIES 27 Custom products developed exclusively for unique customers and applications
--

12000X778 SERIES

MIL SPEC TOGGLE SWITCH



CECC AND MIL QPL TOGGLE

- CECC 96201-005 & 008 approvals
- MIL 3950 & 83731 QPL
- Compact behind panel (50% more compact (width/depth) than MS2452 products)
- Easy to customise : finish, levers with or without locking
- Suitable for immersion (IP68)

SERIES	APPROVALS	POLES	MAXIMUM RATINGS	BUSHING DIMENSIONS	TERMINAL OPTIONS						MOUNTING OPTIONS	SEALING	ILLUMINATION
					Solder lugs	Quick-connect	Screw	PCB	Flying leads	Connector			
12000	CECC MIL-DTL-3950 MIL-DTL-83731	2,3,4	4 A 30 VDC	Ø11,9	x			x			Panel - Vertical - Through hole	IP68	

TOP APP : MILITARY VEHICLES, TACTICAL HEADSETS, UNMANNED VEHICLE CONTROLS



3500 SERIES

HIGH PERFORMANCE TOGGLE SWITCH



TOGGLE FOR DEMANDING APPLICATIONS

- High current rating
- CECC 96201-004 approval
- Easy to customise : finish, levers with or without locking

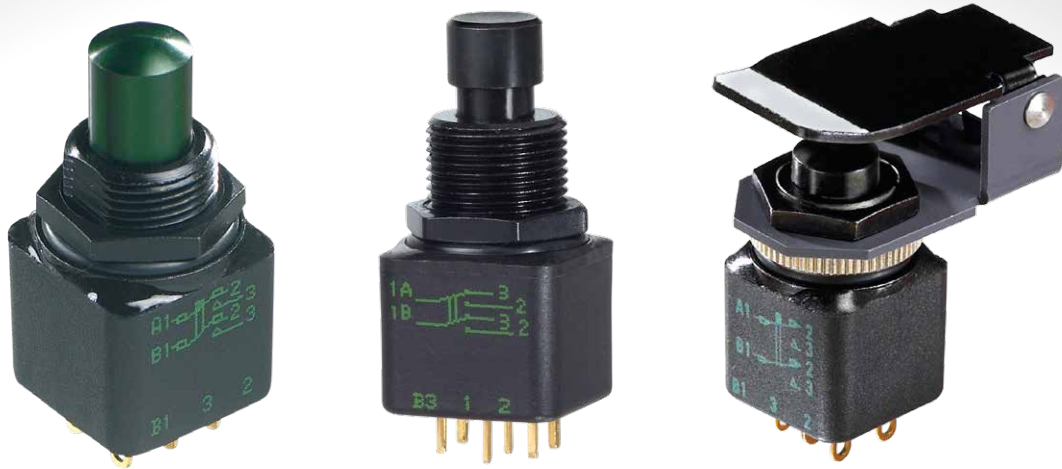
SERIES	APPROVALS	POLES	MAXIMUM RATINGS	BUSHING DIMENSIONS	TERMINAL OPTIONS						MOUNTING OPTIONS	SEALING	ILLUMINATION
					Solder lugs	Quick-connect	Screw	PCB	Flying leads	Connector			
3500	CECC	1,2	15 A 28 VDC	Ø11,9	X	X	X	X			Panel	IP67, IP69K	

TOP APP : MILITARY CONTROL PANELS



13000X778 SERIES

MILITARY GRADE QUICK-BREAK MOMENTARY PUSHBUTTON SWITCH



**HIGH
RELIABILITY
PUSHBUTTON**

- Up to three poles
- Suitable for immersion up to 10 m
- Large actuator version is compliant with MIL-STD-1472F
- CECC 96401-001 approval



SERIES	APPROVALS	POLES	MAXIMUM RATINGS	BUSHING DIMENSIONS	TERMINAL OPTIONS						MOUNTING OPTIONS	SEALING	ILLUMINATION
					Solder lugs	Quick-connect	Screw	PCB	Flying leads	Connector			
13000	CECC	1,2	2 A 250 VAC 4 A 30 VDC	Ø6,35 (1/4) Ø11,9 (15/32)	x			x			Vertical - Through hole - Panel - Horizontal - Through hole	Up to IP68	

TOP APP : WEAPON FUNCTIONS, MILITARY VEHICLES, MILITARY GRIPS



IA, IP, IX AND IZ SERIES

SEALED PUSHBUTTON SWITCH



IA



IP



IX



IZ

LOW PROFILE PUSHBUTTON

- Frost and sand resistant (IA, IX)
- Flush on panel (IA, IX, IZ)
- Strong tactile feedback
- IP67 and up to IP69K for IX

SERIES	APPROVALS	FUNCTION	MAXIMUM RATINGS	BUSHING DIMENSIONS	TERMINAL OPTIONS						MOUNTING OPTIONS	SEALING	ILLUMINATION	
					Solder lugs	Quick-connect	Screw	PCB	Flying leads	Connector				
IA		NO+NC	2 A 24 VDC	Ø16 (.629)						x		Panel	IP67	
IP	UL	1	5 A 28 VDC 4 A 12 VDC	Ø12 (.472)	X	X		X	X			Panel	IP67	X
IX		NO/NC	2 A 28 VDC 100 mA 28 VDC	Ø12 (.472)	X					X		Panel	IP67 IP69K	X
IZ		1	4 A 48 VDC 100 mA 24 VDC	Ø16 (.629)	X	X	X	X	X			Panel	IP67	X

TOP APP : GRIPS, MILITARY VEHICLES, TACTICAL HEADSETS



MSG AND 90 SERIES

SWITCH GUARD



MSG



90



TO SECURE CRITICAL FUNCTIONS

- Many switch guard types available
- Compatible with MIL3950 and MIL83731 toggles

SERIES	CAP MATERIAL	SUPPORT PLATE	OPERATING TEMPERATURE	MECHANICAL LIFE	SWITCHES	LEVER LENGTH
Safety Guards	Thermoset or thermoplastic	Matt black stainless steel	-40°C to +85°C	20 000 cycles (MSG)	Ø11,9 mm Ø12 mm threaded bushing	17,5 mm outside bushing

TOP APP : MILITARY CONTROL PANELS, MILITARY VEHICLES



SEALING BOOTS

TOGGLE & PUSHBUTTON BOOT



ADDITIONAL SEALING BARRIER

- Compatible with MIL3950 and MIL83731 toggles
- Full toggle protection in dust and sand environments

SERIES	BOOT MATERIAL	NUT MATERIAL	OPERATING TEMPERATURE		TEMPERATURE RANGE		ELASTICITY	MECHANICAL RESISTANCE
					Low	High		
Boots	Neoprene or silicone	Brass, nickel plated, matt black	Silicone	-40 °C to +85 °C	Best	Best	Best	Good
			Neoprene	-20 °C to +50 °C	Good	Better	Good	Best

TOP APP : ALL OUTDOOR AND HARSH ENVIRONMENTS



OCL

MT SERIES

SEALED ROCKER SWITCH



SELECTOR SWITCH FOR ERGONOMIC INTERFACE

- Environmentally sealed (IP68)
- Multiple functions available
- Various contact materials that allow usage from dry circuit applications up to 4 A

SERIES	APPROVALS	POLES	MAXIMUM RATINGS	BUSHING DIMENSIONS	TERMINAL OPTIONS						MOUNTING OPTIONS	SEALING	ILLUMINATION
					Solder lugs	Quick-connect	Screw	PCB	Flying leads	Connector			
MT		1	4 A 30 VDC	Ø17,46	x			x			Panel, Vertical - Though hole	IP68	

TOP APP : SEALED ERGONOMIC ELECTRICAL INTERFACE



KR AND KL SERIES

ROCKER SWITCH



KR



KL

CUSTOMISABLE ROCKER SWITCH

- Patented locking system for safety application (KL)
- Customised laser etched legends
- Illuminated versions

SERIES	APPROVALS	POLES	MAXIMUM RATINGS	BUSHING DIMENSIONS	TERMINAL OPTIONS						MOUNTING OPTIONS	SEALING	ILLUMINATION
					Solder lugs	Quick-connect	Screw	PCB	Flying leads	Connector			
KR		1,2	10 A 24 VDC	36,8 X 21,08	x	x	x				Panel	IP68	X
KL		1,2	10 A 24 VDC	36,8 X 21,08	x	x	x				Panel	IP68	X

TOP APP : DASHBOARDS ON MILITARY VEHICLES



OGL

ES AND 13000 SERIES

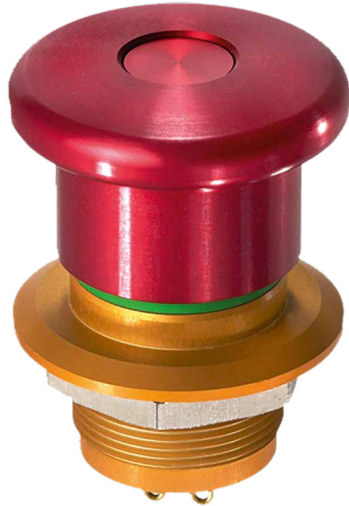
HEAVY DUTY METAL EMERGENCY STOP & SLAM SWITCH



ES



13000



METAL EMERGENCY STOP FOR EXTREME CONDITIONS

- Sealed up to IP65, IP67 & IP69K
- Large actuator for ease of operation
- Compact body for space saving (13000)
- Qualified EN60947-5-1 (ES series)
- Impact resistant to IK10 (ES series)

SERIES	APPROVALS	POLES	MAXIMUM RATINGS	BUSHING DIMENSIONS	TERMINAL OPTIONS						MOUNTING OPTIONS	SEALING	ILLUMINATION
					Solder lugs	Quick-connect	Screw	PCB	Flying leads	Connector			
ES	EN60947-5-1	2,3	1 A 24 VDC DC-14	Ø 22 mm Ø 28 mm	X			X			Panel	IP65 IP67 IP69K	
13000		2,3	4 A - 28 VDC	Ø 15 mm	X			X			Panel	IP65 IP67 IP69K	

TOP APP : MILITARY CONTROL PANELS



MULTIMEC 5 SERIES - 5E & 5G

TACTILE PCB SWITCH



5E



5G

AVAILABLE WITH
NVIS LED,
LARGE SELECTION
OF STANDARD
ACCESSORIES

- Front panel sealing to IP67 with different cap solutions
- Reliable : 10 million activations, strength of actuating tested at twice MIL-PRF-22885H requirements
- Different haptic options (including quiet option)

SERIES	POLES	FUNCTION	MAXIMUM RATING	MOUNTING OPTIONS	SEALING	MECHANICAL LIFE
5E & 5G	Single pole / momentary	NO & NC/NO	50 mA - 24 VDC	Through hole or SMT mounting	IP67	10 million

TOP APP : DISPLAY PANEL FOR WEAPONS SYSTEMS



QRM SERIES

REAR MOUNT LED INDICATOR



REAR MOUNT NVIS LED INDICATOR

- NVIS compliant to MIL standard 3009
- Low profile body
- Able to mimic 12000X778 series toggle behind panel depth
- IP67 sealing
- Black finish

SERIES	PANEL CUT	MAXIMUM RATINGS	SEALING	TERMINAL OPTION		BEZEL FINISH	TYPE OF ILLUMINATION	LED COLOUR
				Pins	Wires			
QRM	6 mm 8 mm 14 mm	2 VDC – 28 VAC/DC	IP67	x	x	Black or Anodized	Fixed light, Bi-colour, Tri-colour (8 & 14 mm)	5 standard colours, 3 hyper bright colours, 6 super bright colours, 3 bi-colours 1 tri-colour
QRM NV	8 mm 14 mm	2 VDC – 28 VAC/DC	IP67	8 mm only	x	Black or Anodized	Night vision	6 NVIS colours

TOP APP : MILITARY VEHICLES, AVIONICS AND NIGHT VISION APPLICATIONS



HR, TW AND CW SERIES

PROPORTIONAL THUMBWHEEL



HR



TW



CW

ROBUST THUMBWHEEL

- Hall effect technology for long life performance
- Electronics sealed up to IP67
- Friction, detents & backlit options available
- Different types of actuators

SERIES	MECHANICAL LIFECYCLES	ERGONOMICS	TECHNOLOGY	OUTPUT OPTION						MOUNTING OPTIONS	SEALING
				Single	Dual	Analog	PWM	USB	CANbus		
HR	5 million (without detent)	Friction hold Spring to center	Hall effect	X	X	X				Rear mounting	IP68
TW	5 million	Spring to center	Hall effect	X	X	X				Drop-in	IP67
CW	3 million	Spring to center	Hall effect	X	X	X	X			Snap-in	

TOP APP : GRIPS



NV SERIES

NAVIGATOR SWITCH



NAVIGATOR SWITCH FOR EASY AND ACCURATE MENU SELECTION

- 16 mm cut-out
- 4 directions and validation in center
- Excellent tactile feedback

SERIES	MECHANICAL LIFECYCLES	AXIS	TECHNOLOGY	OUTPUT OPTION						MOUNTING OPTIONS	SEALING
				Single	Dual	Analog	PWM	USB	CANbus		
NV	1 million	1, 2	Switching	X						Drop-in	IP69K

TOP APP : ROBOTICS CONTROL, UNMANNED AIRCRAFT SYSTEMS



TS SERIES

PROPORTIONAL THUMBSTICK



INTUITIVE METHOD OF CONTROL

- Multiple options available, including pushbutton function and illumination
- Easy to install
- Many actuator styles available
- Designed for harsh environment

SERIES	MECHANICAL LIFECYCLES	AXIS	TECHNOLOGY	OUTPUT OPTION						MOUNTING OPTIONS	SEALING
				Single	Dual	Analog	PWM	USB	CANbus		
TS	1 million	1, 2	Hall effect	X	X	X	X	X		Drop-in or rear mounting	IP67, IP69K *

*dependent on mounting & final specifications

TOP APP : ROBOTICS CONTROL, UNMANNED AIRCRAFT SYSTEMS



OGL

IP DESKTOP SERIES

USB DESKTOP CONTROLLER



DESKTOP CONTROLLER FOR VIDEO SURVEILLANCE

- 3 axis joysticks for P/T/Z control
- Programmable pushbuttons
- USB 1.1 HID compliant
- For indoor environment

SERIES	MECHANICAL LIFECYCLES	AXIS	TECHNOLOGY	OUTPUT OPTION						MOUNTING OPTIONS	SEALING
				Single	Dual	Analog	PWM	USB	CANbus		
IP Desktop	3 million	3	Hall effect					x			

TOP APP : UAV, SECURITY, CCTV, SURVEILLANCE



3000 SERIES

LOW PROFILE HALL EFFECT JOYSTICK



ROBUST FOR MILITARY APPLICATIONS

- All metal mechanism
- IP67 sealing
- Rated for 10 million lifecycles

SERIES	MECHANICAL LIFECYCLES	AXIS	TECHNOLOGY	OUTPUT OPTION						MOUNTING OPTIONS	SEALING
				Single	Dual	Analog	PWM	USB	CANbus		
3000	10 million	1,2,3	Hall effect	X	X	X	X			Drop-in or rear mounting	IP67

TOP APP : FORWARD LOOKING INFRARED RADARS, THERMAL IMAGING



FG SERIES

FIXED GRIP HAND CONTROLLER



RUGGED OPERATION
FOR HIGH VIBRATION
APPLICATIONS

- Rugged hand operation
- Custom configurable
- USB output options
- Protected index trigger

SERIES	MECHANICAL LIFECYCLES	AXIS	TECHNOLOGY	OUTPUT OPTION						MOUNTING OPTIONS	SEALING
				Single	Dual	Analog	PWM	USB	CANbus		
FG	N/A	N/A	Depends on customization					X		Panel	IP65 *

*dependent on mounting & final specifications

TOP APP : TURRET CONTROL



XD SERIES

MULTI-AXIS HAND GRIP JOYSTICK



ROBUST AND COMPACT

- SIL 2 compatible - Redundant Hall sensors
- Resists high axial load (1780 N - 400 lbf)
- Shallow mounting depth of <60 mm (2.36)
- Rated for 10 million lifecycles
- SAE CANbus J1939-71

SERIES	MECHANICAL LIFECYCLES	AXIS	TECHNOLOGY	OUTPUT OPTION						MOUNTING OPTIONS	SEALING
				Single	Dual	Analog	PWM	USB	CANbus		
XD	10 million	1, 2	Hall effect						X	Drop-in	IP67

TOP APP : BATTERY POWERED MOTOR TRAVERSING UNIT, TURRET CONTROL SYSTEM



RUGGEDIZED MILITARY KEYBOARD

CONTROL SYSTEMS FOR HARSH ENVIRONMENTS



PRODUCT FOR A TOUGHEST ENVIRONMENT

- Military qualification to MIL Std 810 G including impact resistance and finger guide to be used with gloves
- Possibility of embedded communication, built in tests or power electronics
- Short development phase
- Integration of multiple components

MULTI FUNCTION CONTROL PANEL

Critical electronic and software design expertise

Meets critical military specifications such as MIL, STANAG, GAM...

Answers to sealing demands : IP65, IP68, IP69K

Standard communication protocols including CAN, USB, RS422, RS485...

Uniform backlighting option

TOP APP : VEHICLE KEYBOARDS



KP6 CANBUS SERIES

RUBBER KEYPADS



STANDARD SOLUTION FOR MULTIPLE BUTTON APPLICATIONS

- Customisable keys
- CANbus output or standard output version
- Backlit pictograms
- 1 Million cycles
- EMC shielded/ESD – Passed "E" marking (ECE R10 approved)

STANDARD 6 BUTTON KEYBOARD

IP65 sealing - option for IP67 and IP69K

Can J1939 and option for CAN Open

9 V to 36 V operating voltage

Easy front mounting, with snap-in / flush design

TOP APP : DASHBOARD



BEZEL KEYBOARD

MEMBRANE SWITCH PANELS WITH PCB



THIN & BACKLIT

- Rear or front panel mounting
- Dimming option
- NVIS capabilities
- Uniform backlighting

CUSTOM BEZEL KEYBOARD

3 mm (.12") thick keyboard

High quality backlit design, status LED indicators

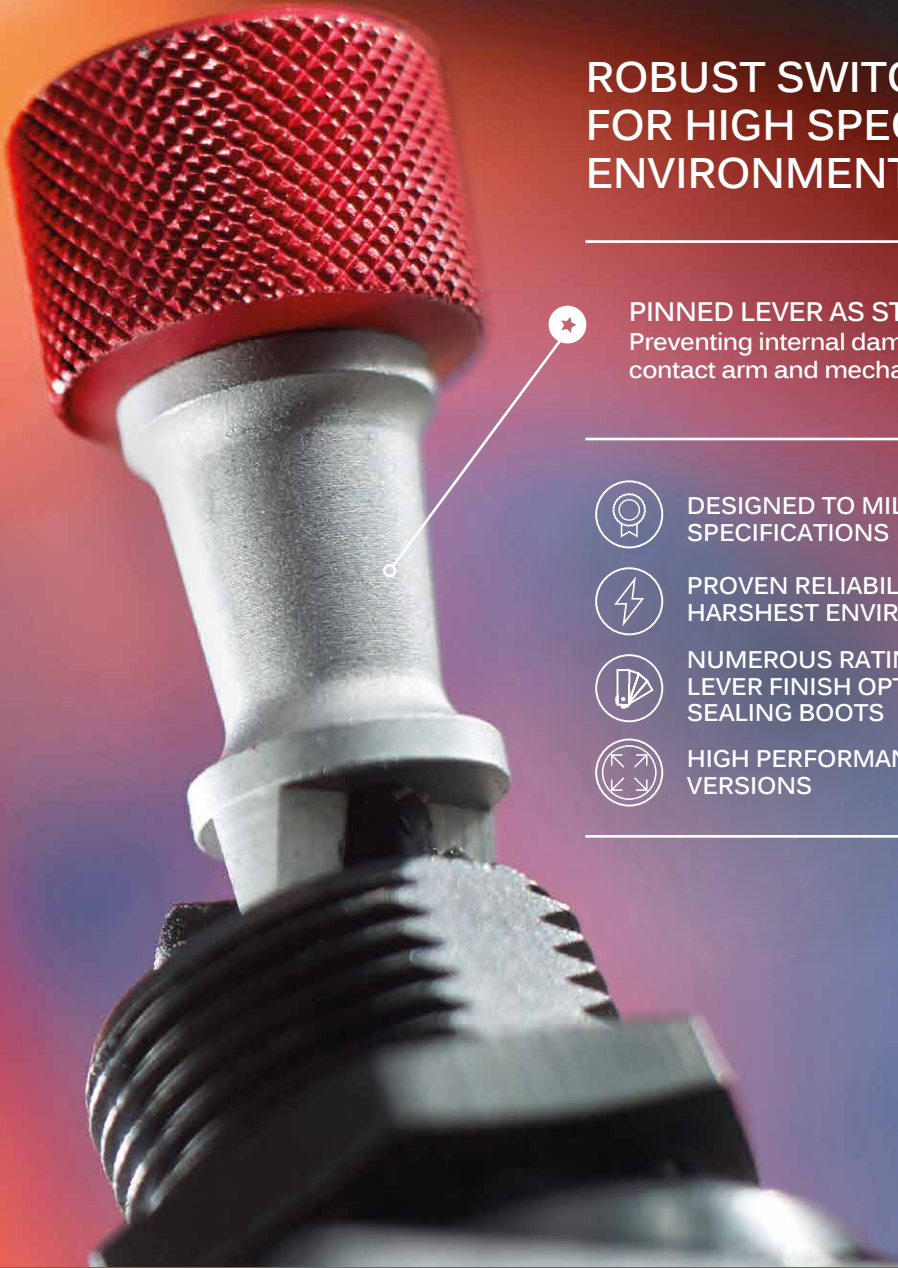
Custom size and custom number of keys

Front mounting for easy customisation

Sealing on request : IP65, IP67, IP68

TOP APP : CONTROL PANEL WITH SCREEN INSIDE VEHICLES, COMMAND SHELTERS, ROV CONTROLS

CUSTOM CAPABILITIES



ROBUST SWITCHES FOR HIGH SPECIFICATION ENVIRONMENTS



PINNED LEVER AS STANDARD
Preventing internal damage to the contact arm and mechanism

**APEM
EXCLUSIVE**



DESIGNED TO MIL & CECC SPECIFICATIONS



PROVEN RELIABILITY IN THE HARSHTEST ENVIRONMENTS



NUMEROUS RATING, SEALING, LEVER FINISH OPTIONS AND SEALING BOOTS



HIGH PERFORMANCE VERSIONS

APEM offers a large range of more than 125 000 part numbers consisting of switches, indicators, joysticks and keypads in different colors, markings, finishes, shapes and dimensions... creating an unlimited combination of possibilities.

APEM develops complete interface solutions

combining components (switches, keypads, indicators, joysticks), standard electronic boards and programming.

An APEM team professional is happy to assist you in the development of these complete turnkey solutions, meeting your specific requirements, with responsiveness and flexibility.



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