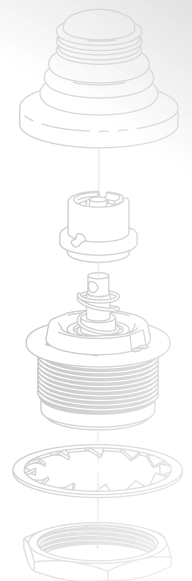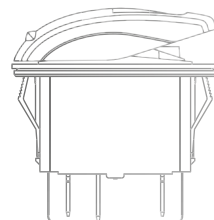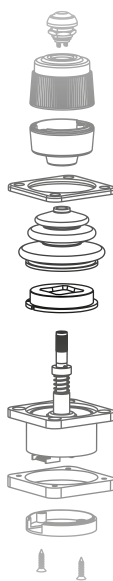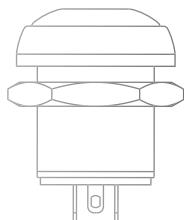# APEM

DEFENCE GROUND EQUIPMENT

A WORLD OF
SWITCHING CAPABILITIES

APEM
IN DEFENCE GROUND EQUIPMENT

APEM is a leading manufacturer of **high-reliability human machine interface (HMI) products** with more than **60 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

OGL

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	Icing, sand and mud resistant, illuminated or not	NEW: 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

- 60 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

12000X778 SERIES

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 DIMEN-SIONS | TERMINAL OPTIONS | | | | | | MOUNTING OPTIONS | SEALING | ILLUMI-NATION |
					Solder lugs	Quick-connect	Screw	PCB	Flying leads	Connector			
12000	CECC MIL-DTL-3950 MIL-DTL-83731	2,3,4	4A 30VDC	Ø11,9	X			X			Panel - Vertical - Through hole	IP68	

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

3500 SERIES

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	ILLUMI-NATION
					Solder lugs	Quick-connect	Screw	PCB	Flying leads	Connector			
3500	CECC	1,2	15A 28VDC	Ø11,9	X	X	X	X			Panel	IP67, IP69K	

TOP APP : MILITARY CONTROL PANELS

13000X778 SERIES

HIGH RELIABILITY PUSHBUTTON

- Up to three poles
- Suitable for immersion up to 10m
- 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	ILLUMI-NATION
					Solder lugs	Quick-connect	Screw	PCB	Flying leads	Connector			
13000	CECC	1,2	2A 250VAC 4A 30VDC	Ø6,35 (1/4) Ø11,9 (15/32)	x			x			Vertical - Through hole - Panel - Horizontal - Through hole	Up to IP68	

OGL

8

IA, IP AND IZ SERIES

LOW PROFILE PUSHBUTTON

- Frost, sand and hydrocarbon resistant (IA)
- Flush on panel (IA, IZ)
- Tactile feedback

SERIES	APPROVALS	POLES	MAXIMUM RATINGS	BUSHING DIMENSIONS	TERMINAL OPTIONS						MOUNTING OPTIONS	SEALING	ILLUMI-NATION
					Solder lugs	Quick-connect	Screw	PCB	Flying leads	Connector			
IA		1	2A 24VDC	Ø16 (.629)					x		Panel	IP67	
IP	UL	1	5A 28VDC 4A 12VDC	Ø12 (.472)	X	X		X	X		Panel	IP67	X
IZ		1	4A 48VDC 100mA 24VDC	Ø16 (.629)	X	X	X	X	X		Panel	IP67	X

TOP APP : GRIPS, MILITARY VEHICLES, TACTICAL HEADSETS

SWITCH GUARD

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)	Ø11,9mm Ø12mm threaded bushing	17,5mm outside bushing

TOP APP : MILITARY CONTROL PANELS, MILITARY VEHICLES

OGL

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

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 4A

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

TOP APP : SEALED ERGONOMIC ELECTRICAL INTERFACE

www.apem.com

ROCKER SWITCH

CUSTOMISABLE ROCKER SWITCH

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

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

TOP APP : DASHBOARDS ON MILITARY VEHICLES

OGL

ES AND 13000 SERIES

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	ILLUMI-NATION
					Solder lugs	Quick-connect	Screw	PCB	Flying leads	Connector			
ES	EN60947-5-1	2,3	1A 24VDC DC-14	Ø 22mm Ø 28mm	X			X			Panel	IP65 IP67 IP69K	
13000		2,3	4A - 28VDC	Ø 15mm	X			X			Panel	IP65 IP67 IP69K	

TOP APP : MILITARY CONTROL PANELS

MULTIMEC 5 Series - 5E & 5G

mec switches

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	50mA - 24VDC	Through hole or SMT mounting	IP67	10 million

TOP APP : DISPLAY PANEL FOR WEAPONS SYSTEMS

OGL

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
- Matt black finish

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

TOP APP : MILITARY VEHICLES, AVIONICS AND NIGHT VISION APPLICATIONS

PROPORTIONAL THUMBWHEEL

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 LIFE CYCLE	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 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	IP68

TOP APP : ROBOTICS CONTROL, UNMANNED AIRCRAFT SYSTEMS

OGL

PROPORTIONAL THUMBSTICK

INTUITIVE METHOD
OF CONTROL

- Multiple options available, including pushbutton function
- Easy to install
- 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	IP68

TOP APP : ROBOTICS CONTROL, UNMANNED AIRCRAFT SYSTEMS

OGL

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

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

FIXED GRIP HAND CONTROLLER

RUGGED OPERATION FOR HIGH VIBRATION APPLICATIONS

- Military grade joystick
- Rugged hand operation
- Custom configurable
- USB and CANbus output options

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	X		IP67

TOP APP : TURRET CONTOL

HAND GRIP HALL EFFECT JOYSTICK

HEAVY DUTY AND FIELD PROVEN

- CANbus options available
- Sealed to IP69K
- Field proven with over 60,000 sold

SERIES	MECHANICAL LIFECYCLES	AXIS	TECHNOLOGY	OUTPUT OPTION						MOUNTING OPTIONS	SEALING
				Single	Dual	Analog	PWM	USB	CANbus		
HG	10 million	1,2,3	Hall effect	X	X	X		X	X	Drop-in or rear mounting	IP68

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

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

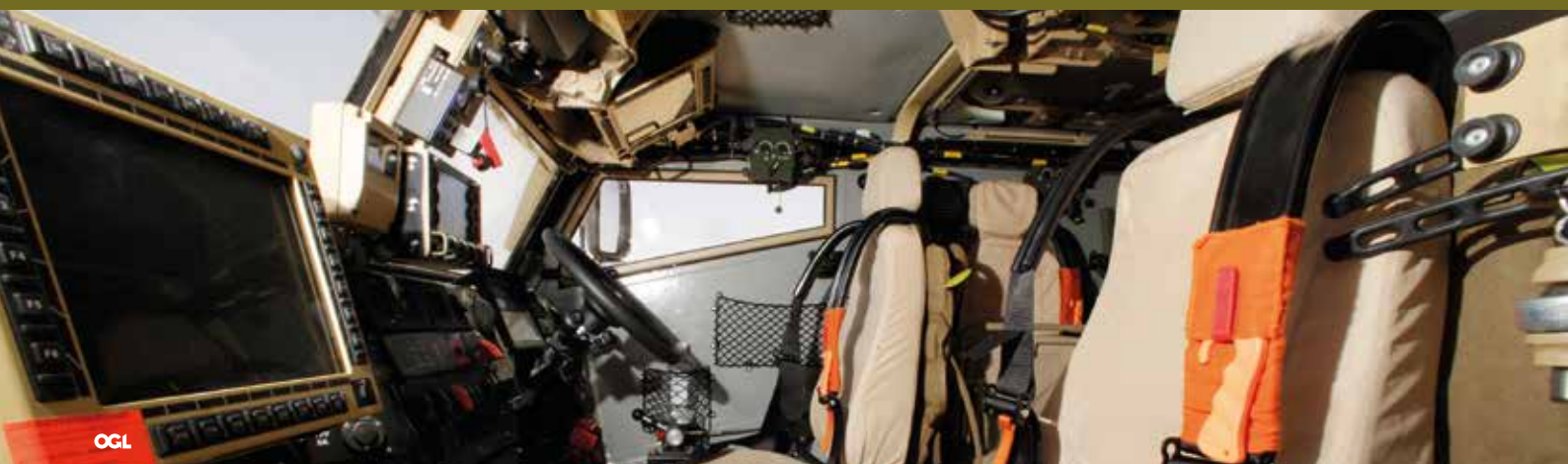| MULTI FUNCTION KEYBOARDS |
| --- |
| Critical electronic and software design expertise |
| Meets critical military specifications such as MIL, STANAG, GAM... |
| Sealing up to IP68 |
| Standard communication protocols including CAN, USB, RS422, RS485... |
| Uniform backlighting option |

TOP APP : VEHICLE KEYBOARDS

OGL

RUBBER KEYPADS

STANDARD SOLUTION FOR MULTIPLE BUTTON APPLICATIONS

- Customisable keys
- CANbus output option
- Backlit pictograms
- 1 Million cycles
- EMC shielded/ESD – Passed E1 European test

6 BUTTON KEYPADS
Sealed up to IP67
CAN Open or Can J1939
6V to 40V operating voltage
Easy front mounting

TOP APP : DASHBOARD

BEZEL KEYBOARD

THIN & BACKLIT

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

BACKLIT
3mm (.12) thick keyboard
High quality backlit design
Status LED indicators
Front mounting for easy customisation
Standard communication protocol including CAN, USB, RS422, RS485

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

OGL

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 HARSHEST 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.

WORLDWIDE SALES & CUSTOMER SUPPORT

AMERICAS

USA
63 Neck Road
HAVERHILL, MA 01835-8025
Tel: (+1) 978 372 1602
Fax: (+1) 978 372 3534
info@apem.com

USA
970 Park Center Drive
VISTA, CA 92081-8395
Tel: (+1) 760 598 2518
Fax: (+1) 760 598 2524
info@apem.com

EMEA

BENELUX
Avenue Excelsiorlaan 21
1930 ZAVENTEM
Belgium
Tel B: (+32) 27 25 05 00
Tel NL: (+31) (70) 799 91 51
Fax: (+32) 27 25 22 00
sales@apemswitches.be

FRANCE
55, avenue Edouard Herriot
BP1
82303 CAUSSADE Cedex
Tel: (+33) 5 63 93 14 98
Fax: (+33) 5 63 93 19 03
commercial@apem.fr

GERMANY
Gewerbehof Giesing
Paulsdorfferstr. 34, 2. OG
D-81549 MUNICH
Tel: (+49) 89 45 99 11 0
Fax: (+49) 89 48 10 39
info@apem.de

ITALY
Via Marconi 147G
12030 MARENE (CN)
Tel: (+39) 0172 74 31 70
Fax: (+39) 0172 74 31 71
apem.italia@apem.it

SWEDEN
Isafjordsgatan 35
S-16440 KISTA
Tel: (+46) 8 626 38 00
Fax: (+46) 8 626 82 49
info@apem.se

UNITED KINGDOM
Drakes Drive
LONG CRENDON, Bucks HP18 9BA
England
Tel: (+44) 1 844 202400
Fax: (+44) 1 844 202500
sales@apem.co.uk

DENMARK
MEC
Industriparken 23
2750 BALLERUP
Tel: (+45) 44 97 33 66
Fax: (+45) 44 68 15 14
danmec@mec.dk

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