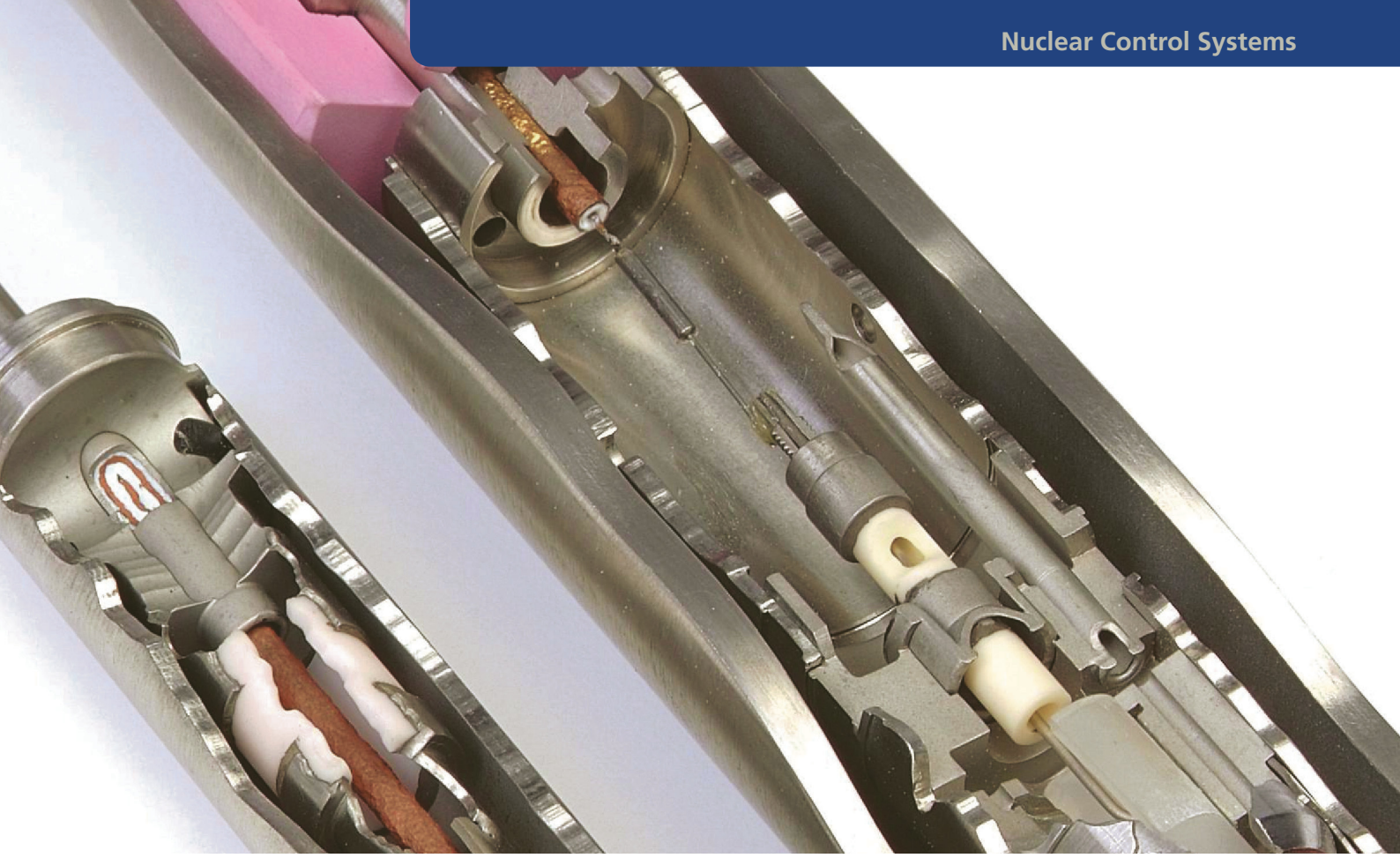


Neutron Flux Detectors

for nucleonic systems

Features

- Suitable for use in high neutron flux fields; 10^{19} nvt lifetime expectancy
- In-core and ex-core models available for up to 1020 °F (550 °C) operating temperature and 650 PSI operating pressure
- Pulse and DC current operating modes allow full reactor power spectrum to be covered
- Minature variants available for flux mapping and other space limited applications.
- Bespoke design service with post installation testing and support

Ultra Electronics offers a wide range of neutron flux detectors designed for use in reactor safety and indication systems. These cover operation from start-up to full power with detectors available to operate in pulse mode, (start-up), direct current ion chamber mode (full power) and Campbelling or variance mode (provides wide range cover). To achieve this coverage, the gas fillings and neutron sensitive coatings of enriched boron or enriched uranium are chosen to meet user requirements.

Devices are available in a range of sizes and for differing environments. These range from detectors designed to operate ex-core at temperatures up to 180 °F (80 °C) to those designed and certified for operation in-core at temperatures up to 1020 °F (550 °C) and at pressures up to 650 psi (50 bar). In-core variants are installed in all the UK Advanced Gas-Cooled Reactors (AGR's) where they are exposed to the reactor coolant gas. A range of miniature detector types have also been designed and exported for use in both research and water reactors.

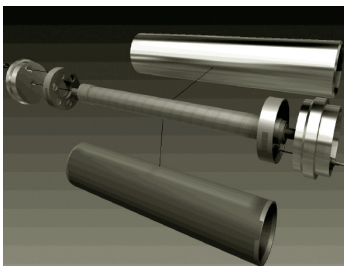
Typically, the ex-core detectors are fitted with coaxial or triaxial polymer sheathed cables whereas the in-core high temperature variants are fitted with mineral insulated cables complete with integral sealed cold-end terminations and connector assemblies. Further variations in the specific construction of the interconnecting cables are possible. The low temperature ex-core types can be fitted with PEEK radiation resistant cables and in-core variants can be fitted with colaminax mineral insulated cables (utilising laminated metallic shielding in the cable outer sheath) for those plant situations where very good electrical interference immunity is required.

Ultra ELECTRONICS

Neutron Flux Detectors

Neutron Detector Specifications

FLUX DETECTOR TYPES									
Ultra Model No.	Diameter mm	Length mm	Max Temp °C	Current Mode A/nv	Pulse Mode Cps/nv	Campbell I Mode A^2/Hz	Gamma Sensitivity A/R/hr	Electrode Coating Material	Gas Filling
FISSION CHAMBERS									
F334	32	335	80	1.56E-15			3.40E-13	235U	H+1% He
F244		438	550	2.1E-14	0.12	2.60E-27		235U	Ar
F233	24	327	550	1.05E-14	0.06	1.60E-27		235U	Ar
F226		261	550	3.90E-15	0.02	4.75E-28		235U	Ar
F435	38	350	350	2.00E-14	0.1		9.00E-12	235U	Ar
F535	51	349	80		0.02-0.2			235U	Ar + 2% N
F645	57	445	550	1.60E-14			7.40E-12	235U	Xe
MINIATURE FISSION CHAMBERS									
FM9131A	9	131	300		1E-3/1E-4			235U	Ar
FM9131B	9	131	300	4.00E-17				235U	Ar
FM5112	5.1	112	300	2.00E-17				235U	Ar
FM589	5	89	300	1.00E-17				235U	Ar
FM366	3	66	550	1.50E-17			4.00E-15	235U	Xe
BOROD LINED ION CHAMBERS									
B435	38	354	300	1.40E-14	2.20E-12		2.20E-12	10B	H
B428	38	279	80	3.30E-15			3.00E-13	10B	H + 1% He
B850	76	495	80	4.20E-14			2.70E-13	10B	H + 2% He
B979	89	787	550	2.15E-14				10B	He
B930	89	297	80	2.00E-14				10B	H
B930	89	297	80	3.00E-14				10B	H
B935	89	345	100	1.20E-14				10B	H



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Ultra Electronics
NUCLEAR CONTROL SYSTEMS
Innovation House, 7 Lancaster Road
Ferndown Industrial Estate
Wimborne, Dorset BH21 7SQ, England
Tel: +44 1202 850450
Fax: +44 1202 850451
Email: sales@ultra-ncs.com
www.ultra-ncs.com
www.ultra-electronics.com

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