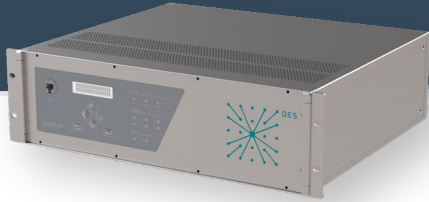
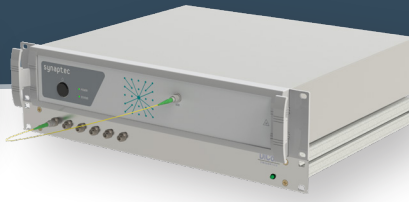


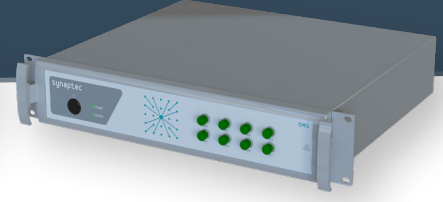
Interrogators



Distributed Electrical Sensing (DES) Interrogator



Multi-channel Distributed Electrical Sensing (mDES)

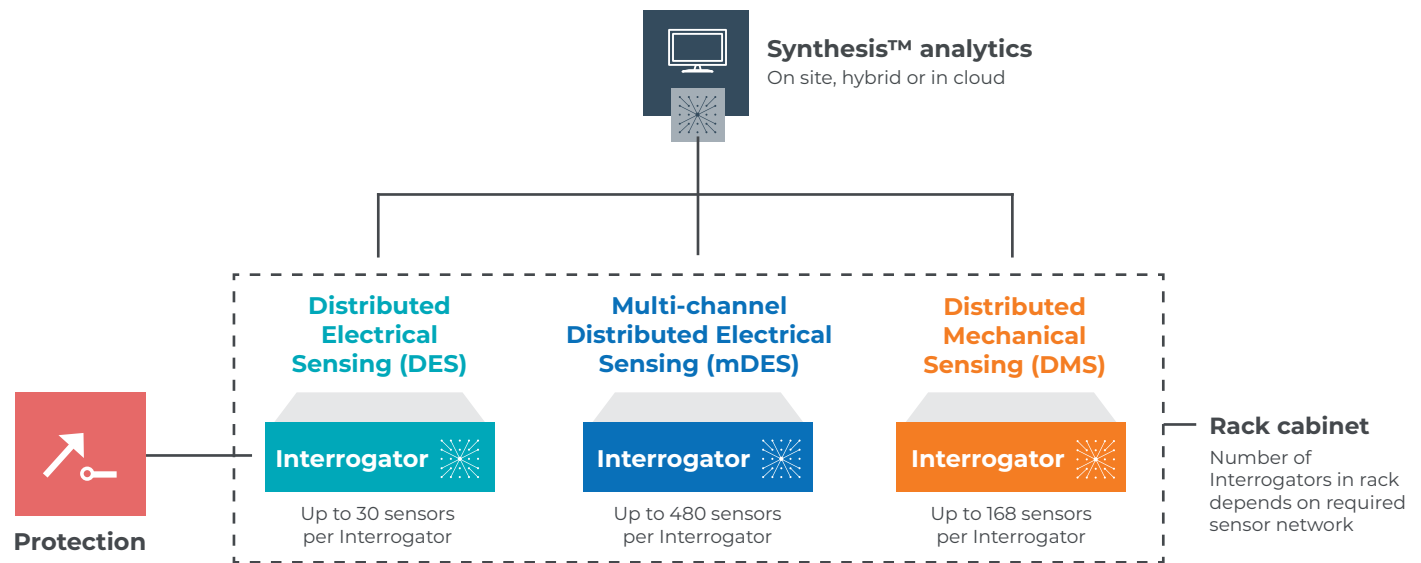


Distributed Mechanical Sensing (DMS) Interrogator

The Interrogator is the core component in all Synaptec installations, responsible for performing centralised, light-speed interrogation of every sensor in the array.

Modular and scalable, they fully support any mix of Synaptec’s electrical and mechanical sensors and perform real-time analysis of the performance and condition of power networks.

Interrogation and analysis options



Max sensors per fibre	30	30	21
Max fibres per Interrogator	1	16	8
Max publishing rate	14.4 kHz (synchronised waveforms)	1 Hz (RMS values)	1 Hz
Applications	Protection, metering and condition monitoring	Condition monitoring	Condition monitoring
Supported electrical sensors*	PCT, PVT, PCVT	PCT, PVT, PCVT	n/a
Supported mechanical sensors*	PST, OHLS, PTT	PST, OHLS, PTT	PST, OHLS, PTT

* PCT: Photonic Current Transducer, PVT: Photonic Voltage Transducer, PCVT: Photonic Current and Voltage Transducer, PST: Photonic Strain Transducer, OHLS: Overhead Line Sensor, PTT: Photonic Temperature Transducer.

The **DES Interrogator** is Synaptec's core, high-performance Interrogator, designed primarily for Distributed Electrical Sensing (DES). The DES Interrogator streams live data in industry standard formats including IEC 61850 Sampled Values or custom data formats, and alarms in GOOSE format.

All measurements are time-synchronised, accurately time-stamped to within a microsecond, and published at up to 14.4 kHz, enabling the system to support a combination of protection, metering, and condition monitoring applications. The DES Interrogator synchronously monitors up to 30 sensors over 60 km of standard telecoms fibre, processing and streaming waveform data in real time with industry-leading latency and detail.

The **mDES Interrogator** is designed for multi-channel, periodic monitoring of electrical and mechanical sensors with unprecedented efficiency. The mDES Interrogator module is coupled to a multi-channel optical switch, allowing up to 30 sensors per fibre to be monitored in turn at up to 1 kHz. RMS values from each fibre (up to 16 fibres per system) are reported at custom timescales from seconds to minutes, enabling very high numbers of measurements for condition monitoring applications.

The **DMS Interrogator** monitors mechanical sensors for temperature, strain and overhead line sag at the slower rate of 1 Hz appropriate for such measurands. Available with up to 8 optical channels, each of which can monitor up to 21 mechanical sensors, the DMS Interrogator enables highly-efficient, highly-multiplexed mechanical condition monitoring for power systems assets.

The uniquely powerful and flexible nature of Synaptec's Interrogators makes them ideal for long-range, multi-point protection, automation, control and condition monitoring applications. Streaming data from DES, mDES and DMS Interrogator modules are brought together by Synthesis™ to provide live system condition visualisation, configurable alarms, performance insights, and decision support for asset managers.

Specifications

	DES Interrogator	mDES Interrogator	DMS Interrogator
Mechanical			
Dimensions	19" 3U rack (447 x 425 x 132 mm)	Interrogator: 19" 2U rack (483 x 400 x 88 mm) Optical switch module: 19" 1U rack (483 x 342 x 43.65 mm)	19" 2U rack (483 x 400 x 88 mm)
Weight	8.3 kg	Interrogator: 7 kg Optical switch module: 2.8 kg	7 kg
Power supply			
Voltage	100 - 240 VAC 110/220 VDC	100 - 240 VDC	100 - 240 VDC
Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Maximum power consumption	90 W	22.5 W	17.5 W
Redundancy	Integrated dual-redundant	Single	Single
Environmental			
Operating temperature	-25 to +55 °C	0 to +50 °C	0 to +50 °C
Storage temperature	-25 to +70 °C	-20 to +60 °C	-20 to +70 °C
Humidity	to 93% at +40 °C	to 90% at +40 °C	to 90% at +40 °C
Shock endurance	15 g (in each axis); 11 ms pulse (IEC 60255-21-2)	20 g (in each axis); 11 ms pulse (IEC 60068-2-27)	20 g (in each axis); 11 ms pulse (IEC 60068-2-27)

Specifications (continued)

	DES Interrogator	mDES Interrogator	DMS Interrogator
Sinusoidal vibration endurance	1g (10 - 150 Hz); 20 cycle/axis (IEC 60255-21-1)	2.5 g (5 to 65 Hz); 30 min/axis (IEC 60068-2-6)	2.5 g (5 to 65 Hz); 30 min/axis (IEC 60068-2-6)
IP rating	IP3X	IP20	IP20
Optical input			
Number of optical channels	1	16	8 (max)
Number of sensors per channel	30 ¹	30 ¹	21 ²
Fibre type	Standard simplex single-mode	Standard simplex single-mode	Standard simplex single-mode
Interface	SC/APC	FC/APC	FC/APC
Communications interfaces and IO			
Number of Ethernet ports	6x Gigabit Ethernet	1x Ethernet	1x Ethernet
Ethernet interface	SFP (user selectable interface type)	RJ45	RJ45
Redundancy	IEC 62439-3 PRP	n/a	n/a
Protocol(s)	IEC 61850-9-2 "LE", IEC 61869-9, IEC 61850-8-1 (GOOSE), customised datasets	SCPI	SCPI
Supported sampling rates	4 kHz, 4.8 kHz, 14.4 kHz	1 kHz	1 Hz
Watchdog contact	Normally open (NO) and normally closed (NC) terminals	n/a	n/a
Time synchronisation			
Protocol(s)	PTP: IEC/IEEE 61850-9-3 PPS: input and output via optical multimode ST fibre NTP: synchronisation of system clock to a specified NTP server (not suitable for precision synchronisation of waveform samples)	NTP	NTP
HMI			
Software configuration and management	Secure web interface – integrated within Interrogator	Secure web interface – integrated within Interrogator	Secure web interface – integrated within Interrogator
Configuration port	Front panel: RJ45 Gigabit Ethernet	RJ45 Ethernet	RJ45 Ethernet
Display	2x16 alphanumeric	n/a	n/a
LEDs	Indicators for alarms, Ethernet connections, and power	Indicators for power and status	Indicators for power and status
Reference standards			
Environmental/EMC	IEC 61850-3	IEC 60068-2	IEC 60068-2

¹ Assumes 5P10 class Photonic Current Transducers with operating temperature range -5 °C to +40 °C.

² Assumes Photonic Temperature Transducers with operating temperature range -40 °C to +100 °C.