# THREE PHASE PRIMARY INJECTION



### **TriRaptor: Applications**

## TriRaptor: Commissioning





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#### Motor protection relays

Modern inline relays feature numerous functional options and user-selectable settings, and use the line's power to operate, so they cannot be easily tested with single-phase injection. The TriRaptor produces a stable and accurate output of up to 9 kA with 120° between phases, and can measure operation time by monitoring the relay's tripping output or directly the current flow.



#### Circuit breaker testing

Single- and three-phase protective functions in low-, medium-, and high voltage circuit breakers can be now easily tested with the TriRaptor, thanks to its wide current range, 3 kVA output power, and pre-selectable current values. Trip time is automatically measured even when a secondary protective device e.g. a relay cannot be accessed for testing.

#### Substation commissioning

Connect the TriRaptor's three-phase output to both ends of a busbar and let it maintain a pre-defined test current while you browse the entire installation for inaccuracies and possible connection mistakes, quickly and safely, using harmless voltage. Typical commissioning targets:

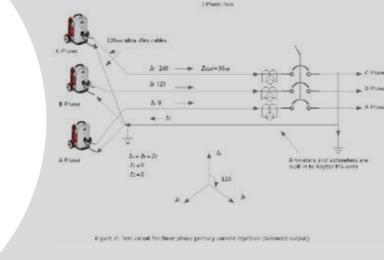
Phase consistency

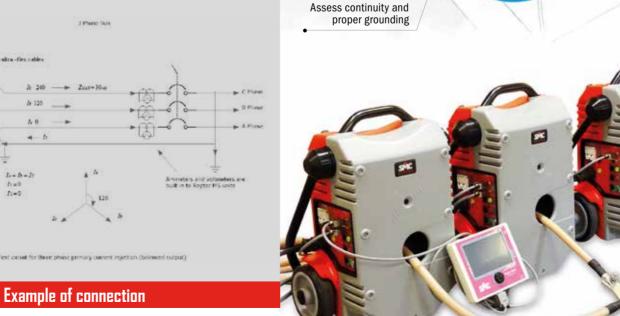
Grounding

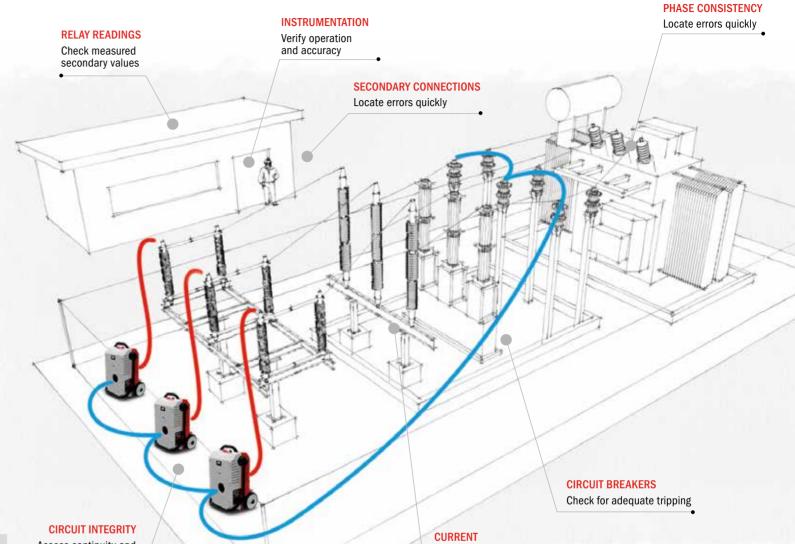
Instruments

Shorting jumpers left in place

- Circuit continuity
- CT ratio and polarity
- Secondary equipment connections
  Protective relay settings
- Phase order
- Differential circuits







#### **TEST TEMPLATES**

Ratio, polarity



Using the same user-friendly philosophy as in the single phase Raptor, the TriRaptor's user interface has been implemented on a larger touch screen and furnished with pre-defined templates that provide ON/OFF synchronization of the three output phases. Test current values can be preset and dynamically adjusted individually and time results and other measurements are recorded and displayed for each phase.



When injecting in polarized (asymmetrical waveform) mode, the Raptor Polarity Tester can be used to check the entire installation for connection errors in a matter of minutes.

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## TriRaptor: Specifications

**BINARY INPUT** 

	turn sec. 960 mm², measured 25 cm on each side)
IGH CURRENT OUTPUT	
utput Current	Output Voltage
Load V (0%Imax)	0 - 1.20 Vac - Continuous
8 KAac (25%Imax)	0 - 0.81 Vac - Continuous
5 KAac (50%Imax)	0 - 0.42 Vac - 3 min
5 KAac (Imax)	0 - 0.22 Vac - 3 s
Load Resolution	25 uVac
utput Frequency	Same as supply's (50/60 Hz)
anges	0-1 KAac/N; 0-15 KAac/N (n: number of secondary turns)
esolution	1 Aac, 10 Aac
ccuracy	±0.2% of the value ±0.2% of the range
nase angle	±0.25°
OW CURRENT OUTPUT	(not simultaneous with high current output)
utput Current	0 - 35 Aac (0 - 9 Aac continuous)
ltage Output	0 - 200 Vac
utput Frequency	Same as supply's (50/60 Hz)
olated output	Yes
otection	Fuse
MMETER/LOW LEVEL V	OLTMETER
nmeter Ranges	0 - 0.2 / 0 - 2 / 0 - 20 Aac
nmeter Resolution	0.1 mAac, 1 mAac, 10 mAac
nmeter Impedance	<10 m $\Omega$
Itmeter Ranges	0 - 30 mVac, 0 - 0, 3 Vac, 0 - 3 Vac
Itmeter Resolution	0.01 mVac, 0.1 mVac, 1 mVac
Itmeter Impedance	>3000 KΩ
equency range	20 - 400 Hz
curacy	$\pm 0.1\%$ of the value $\pm 0.1\%$ of the range
ase angle	±0.25°
plated input	Yes
LTMETER	
inges	0 - 0.2 / 0 - 2 / 0 - 20 / 0 - 300 Vac
esolution	0.1 mVac, 1 mVac, 10 mVac, 0.1 Vac
pedance	>120 KΩ
equency range	20 - 400 Hz
ccuracy	$\pm 0.1\%$ of the value $\pm 0.1\%$ of the range
nase angle	±0.25°
plated input	Yes

Туре	Dry contact / Voltage	
Voltage mode Levels	1.5 V, 15 V ; Max. Voltage 250 Vac.	
Time resolution	1 ms	
Isolated input	Yes	
COMMUNICATIONS		
$2\ x$ RS-485 Raptor Bus connectors from previous R-MS or 3xHH to next R-MS		
GENERAL		
Supply	$230\text{V}\pm\!10\%, 50/60\text{Hz},$ single phase (all the 3 units must be plugged into the same phase and must be connected in parallel or wye)	
Weight	35 Kg / 77 lb	
Dimensions	550 x 440 x 230 mm / 21 ½" x 17 ½" x 9"	
Working temperature	0-50° C	
Storage temperature	-25 to + 70 °C	
Protections	MCB, overload, temperature, supply, communications, polarity	
Sec. hole diameter	85 mm	
Transport	Wheels, folding handle, fixed handle	
Mini-PC powered by Window CONTROL	is CE	
Display	7" high definition color TFT	
Interface	Resistive touch panel + Rotary Encoder (turn & push)	
LEDs	Alarm, Connectivity, Power	
COMMUNICATIONS		
RS-485	Raptor BUS Communication with Raptor-MS	
USB	Connection to PC	
RJ-45	Ethernet for software updates	
GENERAL		
Power Supply	Self-powered from Raptor-MS, or with external 5V AC/DC power adapter with a real consumption of about 1A	
Weight	1 Kg / 2 lb	
Dimensions	224 x 164 x 40 mm / 8" x 6" x 1 ½"	
Case	High quality injection-molded ABS. Entire backface covered with magnet + rubber for fixation	
Transport	Soft nylon bag.	
Connection cable	5 m / 16 ½ ft (3 no.)	
Compliance	The instrument is intended for use in high-voltage substations and industrial environments. All EuroSMC products comply to CE-marking directives and IEC and international standards, and are designed and manufactured in accordance with ISO-9001 quality standard.	