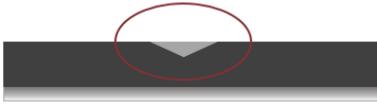
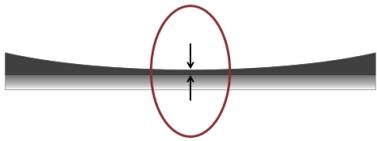


Technical Specification

PantoScanner Mark V



SYSTEM MEASUREMENTS		
	Missing carbon/ Vertical crack	Resolution is 1 mm, accuracy ± 2 mm Standard deviation of less than 1 mm Minimum detectable size (W x D): 5 x 3 mm
	Edge chip width, width of crack at the edge of the carbon strip	Resolution is 1 mm, accuracy ± 2 mm Standard deviation of less than 1 mm Minimum detectable size (W x D) at laser line: 5 x 5 mm
	Abnormal wear width and depth	Resolution is 1 mm, accuracy ± 2 mm Standard deviation of less than 1 mm Minimum detectable size (W x H): 5 x 3 mm
	Thickness of carbon strip	Resolution is 1 mm, accuracy ± 2 mm Standard deviation of less than 1 mm
	Uplift displacement and uplift force	Displacement resolution is 1 mm Force accuracy is based on the wire dynamics
	Missing horn and horn displacement	Detects the presence of the horns of the pantographs
	Yaw angle Roll angle Pitch angle	Range is -6° to $+6^\circ$

General note on measurements: Accuracy and resolution may vary depending on type of pantograph, manufacturing tolerances on new carbon strips, frequency of observations, local conditions, as well as differences in manual measurements for references.
For all measurements, it is assumed the carbon strips are still in contact with the contact wire.

SYSTEM GENERATED ALARMS	
Alarm thresholds	Configurable alarm thresholds per measurement, pantograph model and train operator
Alarm levels	Up to three severity levels supported

PANTOSCANNER TECHNICAL SPECIFICATIONS	
Performance	
Train Speed	2 km/h to 200 km/hour
Train direction	Monodirectional, bidirectional is optional
Carbon strip length supported	650 – 1650 mm
Ambient temperature range	-40 to +50 degree C (heating & cooling included)
Ambient humidity	Up to 98%
Installation	
Scanner size	L: 893 x W: 320 x H: 743 mm (without gantry or servicing system)
Scanner weight	60 kg, plus options
Scanner height above catenary wire	1800 – 2000 mm
Power supply required	1 x 230 V, 10 A, max. 1 kW (Consumption at rest without TEC: 70 Watt)
Isolation Class	IP55
Data network required	10 Mbit/s recommended, min. 2 Mbit/s, or 3G
Typical track mounted equipment	Wheel sensors and/or RFID antenna
Service Recommendations	
Maintenance visits at scanner site	Typically 2 times during a year depending on the environment

PANTO SOFTWARE TECHNICAL SPECIFICATIONS	
PantoCloud or PantoServer	
Operating system	Microsoft Windows Server 2012, or higher
Interface Options	Local train information systems, Email, FTP, Panto standard API
Time to process recorded data	Typically < 10 seconds
Capacity	Storage capacity, only limited by disk space
PantoClient	
Operating System	Microsoft Windows or any web-browser
Language	English. Translation to another language is optional
Minimum recommended screen resolution	1280 x 900