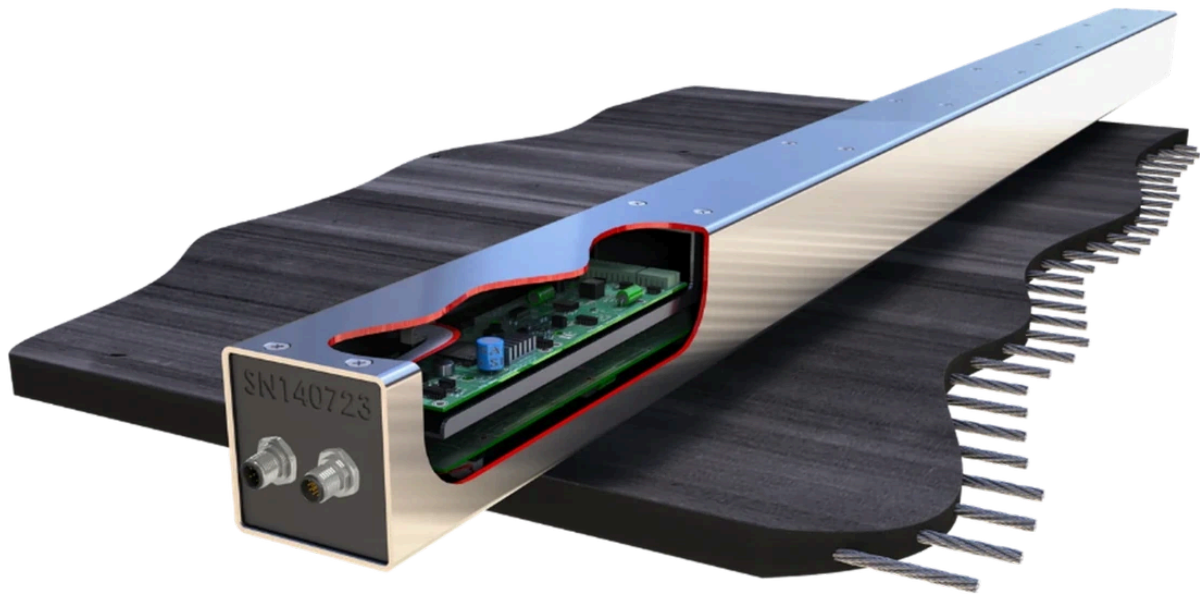


BELT GUARD · CONDITION MONITORING

BELT SCANNER MF FIXED

PERMANENT ELECTROMAGNETIC CONDITION MONITORING — STEEL CORD

Continuous electromagnetic condition monitoring for steel cord conveyor belts.



BELT SCANNER — 316 STAINLESS, CUTAWAY

OVERVIEW

24/7 CONDITION MONITORING WITH DED & PROGRAMMED PARKING

The Belt Scanner MF Fixed is a permanently installed, non-contact electromagnetic condition monitoring system for steel cord conveyor belts. It provides continuous, high-resolution detection and quantification of internal carcass damage — broken cords, corrosion, kinks, fatigue, missing cords and splice anomalies — at the individual cord level.

Unlike the Portable variant, the Fixed system operates 24/7 and delivers two operational features the Portable cannot: Disastrous Event Detection (DED) for automated belt stop protection, and Programmed Parking for automated belt positioning during maintenance.

BELT TYPE Steel cord	SENSING Inductive	SCANNING Belt running
POWER 24 VDC · 110/240 VAC	SCANNER STANDOFF 35 mm (50 max)	COMMS. Ethernet TCP/IP

WHY BELT SCANNER MF **FIXED**



MAGNETISE, THEN READ

Two conditioning heads magnetise the steel cords as the belt passes. The scanner sits at least a metre downstream and reads the signature they leave behind – it adds no field of its own.



LOCKED TO BELT POSITION

A tachometer synchronises the scan to the belt, so every event carries a location and successive scans can be compared at the same point on the same cord. Live data is matched against the stored Belt Signature File.



ALWAYS ONLINE

Run remote scans at any time. Data download, configuration and diagnostics via the TCP/IP site network or remote broadband.



NOTHING IN THE BELT

The scanner works non-contact, 35 mm above the belt surface. No loops, sensors or markers are embedded in the belt and the belting itself is not modified. Belt manufacturer independent.



ACTS THROUGH YOUR CONTROL SYSTEM

Healthy, Halt, Sync Lock and Park relay outputs. DED can halt the belt on a significant signature change; Programmed Parking brings a nominated splice to an inspection station.



INDIVIDUAL CORD RESOLUTION

High-resolution analysis of steel cord condition, reported per damage type across the belt width.

ALWAYS ONLINE

DED 24/7 protection · Programmed Parking · Remote scanning. Data download, configuration and diagnostics run over the TCP/IP site network or remote broadband, so scans can be started and reviewed without anyone standing at the conveyor.

WHAT IT DETECTS

- **Broken cords** — Complete wire breaks within a cord
- **Rusted / corroded cords** — Corrosion-induced magnetic changes
- **Kinked cords** — Vertical plane deformation from belt handling damage
- **Fatigued cords** — Filament discontinuity from plastic deformation and ductile failure
- **Missing cords** — Absent cords in the belt cross-section
- **Splice anomalies** — Deterioration detected via magnetic signature comparison between scans

PRINCIPLE OF OPERATION

ELECTROMAGNETIC CONDITION SCANNING

Two permanent magnet arrays (conditioning heads) are permanently installed above and below the belt, 35 mm from the surface. As the belt passes between them, the steel cords are selectively magnetised. Any cord discontinuity produces magnetic flux leakage, which is read by the Belt Scanner positioned downstream of the conditioning heads. Data is processed, stored and synchronised against the belt's unique magnetic signature.

01

CONDITION & DETECT

The conditioning heads magnetise the cords. The Belt Scanner reads the magnetic signature of each cord continuously. Damaged cords produce flux leakage anomalies, stored in non-volatile memory.

02

SYNCHRONISE

The system matches live incoming data against a stored Belt Signature File. When synchronised, the Sync Lock relay toggles – enabling DED and Programmed Parking.

03

PROTECT & PARK

DED monitors the cord damage count at every belt cross-section 24/7. If a threshold is exceeded, HALT is issued. Programmed Parking positions any splice or event at a maintenance location automatically.

DED – DISASTROUS EVENT DETECTION

DED continuously analyses raw data from the Belt Scanner 24/7. The number of damaged cords at any belt cross-section is compared against a site-defined threshold. If that threshold is violated, a HALT command is delivered to the Main Electrical Enclosure and the HALT relay is toggled. No embedded elements – magnetic signature tags or loops – are required for synchronisation.

PROGRAMMED PARKING

Any splice or event identified in the scan data can be automatically positioned at a designated maintenance location. The system calculates the belt distance, runs the conveyor until the target section arrives, and stops the belt. A dedicated PARK relay toggles to show the stop was a parking event, not a DED event – eliminating manual belt-inching.

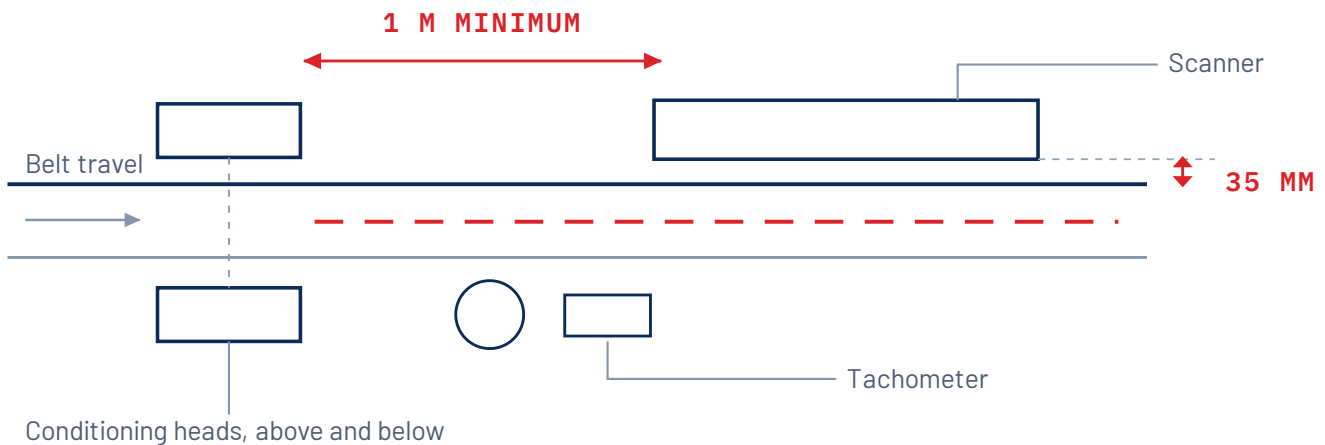
PLC INTEGRATION

RELAY OUTPUTS

RELAY	FUNCTION	DETAILS
HEALTHY	System operating normally, no faults	Form C, 5 A 240 VAC
HALT (DED)	Energised when a DED event is detected and DED is enabled	Form C, 5 A 240 VAC
SYNC LOCK	Energised when the belt is synchronised to its magnetic signature	Form C, 5 A 240 VAC
PARK	Energised when the conveyor is stopped by Programmed Parking	Form C, 5 A 240 VAC

The HALT relay is hard-wired into the site SCADA environment to stop the conveyor. DED requires belt synchronisation – it is not active when the device is not synchronised.

HOW IT READS



IN THE FIELD

- 01 Mount the scanner **35 mm above the belt**, marked side facing the belt. More than 50 mm weakens the signature and the analysis with it.
- 02 Fit both conditioning heads at the same 35 mm standoff — a difference greater than 10 mm between them degrades the signature.
- 03 Keep the conditioning heads and the tachometer **at least 1 m clear of the scanner**, so their own fields don't reach it.
- 04 Calibrate, then scan with the belt running. A long conveyor can take a few hours; nobody needs to stay connected while it runs.
- 05 Upload a fresh Belt Signature File after each analysis. A stale signature is the usual cause of DED false trips.

TACHOMETER GAP

10–30 mm between the non-contact tachometer and its magnet. The tachometer tracks longitudinal position, which is what gives every event a location and makes parking possible.

SYSTEM COMPONENTS

WHAT'S INCLUDED

BSMF BELT SCANNER

316 stainless steel, spans the full belt width, mounted 35 mm from the belt surface

2 × CONDITIONING HEADS

316 stainless steel permanent magnet arrays, spanning the full belt width plus wander

MAIN ELECTRICAL ENCLOSURE

Stainless steel. Relay outputs, DED and Park integration, power supply

TERMINATION ENCLOSURE

Stainless steel. Belt Scanner cable termination, installed near the Belt Scanner

NON-CONTACT TACHOMETER

Longitudinal position tracking for belt synchronisation and parking

BSMF DATA VIEWER + BELT ANALYSIS

Scan control, DED configuration, parking and data analysis. 12 months included

TECHNICAL DATA

Belt type	Steel cord
Contact	Non-contact (35 mm from belt)
Belt Scanner construction	316 stainless steel
Belt Scanner size	80 × 80 × L mm (per belt width)
Belt Scanner weight	15–17.5 kg per metre length
Conditioning Head construction	316 stainless steel
Conditioning Head size	40 × 40 × L mm (per belt width)
Conditioning Head weight	7–7.5 kg per metre length (each)
Scanner standoff	35 mm from belt surface (50 mm maximum)
Tachometer to magnet	10–30 mm
Communications	Ethernet TCP/IP
Power supply	24 VDC / 110 VAC / 240 VAC
Relay outputs	4 × Form C, 5 A 240 VAC
Operating temperature	–25 °C to +70 °C
Storage temperature	–40 °C to +80 °C
Humidity	5–95 % RH

INSTALLATION

Conditioning heads: permanently installed above and below the belt at 35 mm from the belt surface. Must span the full belt width plus wander allowance. Located in a flat belt path away from electrically noisy equipment.

Belt Scanner: positioned downstream of the conditioning heads in a flat belt path with minimal flap and droop. Stainless steel construction spanning the full belt width.

Commissioning: installation by site personnel, with remote guidance from Beltscan. Detailed wiring and mounting specifications are supplied. Typically 1–2 days including commissioning.

ONGOING REQUIREMENTS

Visual inspections should be carried out regularly to ensure all mounts are secure, and a light hose down periodically keeps the system free from product build-up. There are no user-serviceable components inside the Belt Scanner.

Belt Signature File: update periodically to reflect changes in the belt's magnetic signature over time. This maintains DED accuracy and prevents false events from known damage.

WHERE IT'S USED

Critical Overland Conveyors

Mining Operations

Coal Handling Plants

Port Ship-Loading

Iron Ore Processing

Alumina / Bauxite

High-Value Belt Assets

Splice Condition Trending

Also available with an optional Beltscan data analysis service for monthly remote condition reporting.