

5 km Regenerative Conveyor Belt

Australia



5km Regenerative Conveyor Belt



Country: Australia
City: Newcastle
(NSW)

Technical Specifications:

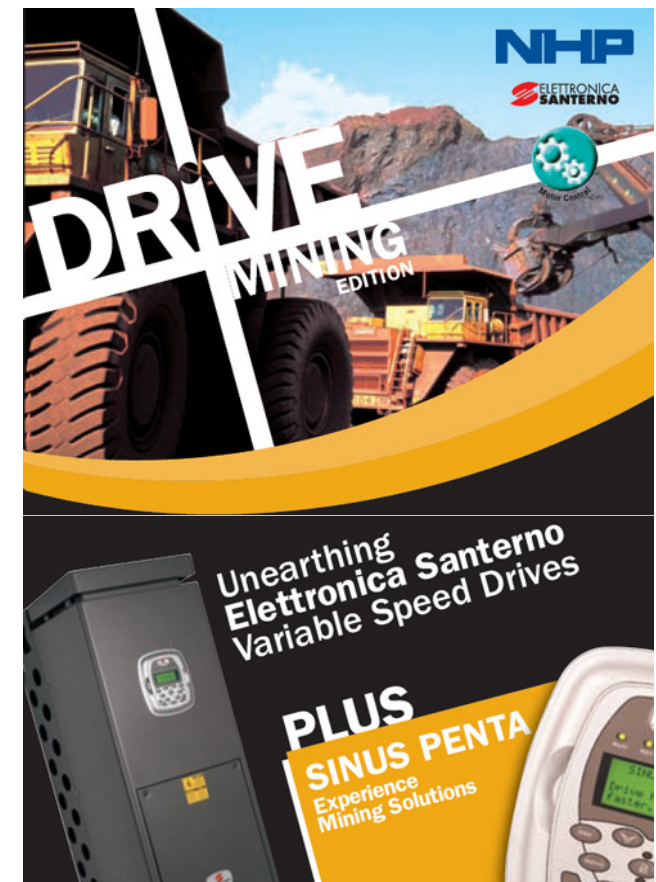
Length of unloader #1: 300m

Length of unloader #2: 5 Km

n.3 motors, 900kW 50Hz @ 690Vac

n.1 motor, 500kW 50Hz @ 690Vac

Unloader speed: 5m/s



5km Regenerative Conveyor Belt



At the unloading station all wagons loaded of coal are sent. The coal is unloaded in an underground conveyor screw..

...where, through a 300m conveyor (1 500kW motor is brought at the surface level and sent to the main conveyor belt.



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The motors drive the 5Km conveyor belt which transports the coal to the thermoelectric power.



Each conveyor is driven by 2 motors in master-slave connection one 900kW motor in the head and one in the tail; the communication between inverters and PLC is via Ethernet.

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All motors are driven by SINUS-PENTA inverter controlled using the F.O.C. algorithm.

The motor inverters (n.3 SINUS PENTA 0831 and n.1 SINUS-PENTA 0457) are Dc supplied by as many regenerative PENTA-RGN inverters of the same sizes.



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Each motor inverter is equipped with an Ethernet card for supervision purposes only.

The PLC sends hardware commands and a hardware reference (analog reference).



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Master-Slave Motors 900 kW

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The 5 km route



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Thermoelectric Power Plant





Conveyor applications:

SINUS PENTA has the in-built capabilities to cater for:

- ✦ Fixed or variable speed control
- ✦ Synchronisation with parallel conveyors

Hoist applications:

The SINUS PENTA offers:

- ✦ High overload capability
- ✦ Integrated functions to handle brake control & fluxing to ensure optimum motor magnetisation
- ✦ The load is always controlled without need for encoder feedback
- ✦ Regeneration caused by lowering loads can be handled by brake resistors OR by using a fully regenerative drive

Refer to page 7 of the Elettronica Santerno catalogue (ESD-C) for overload requirements.

Crusher applications:

The SINUS PENTA has:

- ✦ Standard (140 % overload) and Heavy (175 % overload) ratings to suit cone, jaw and vertical impact crushers
- ✦ Ability to vary the operating speed to allow optimal feed rate of material into the crusher to match current conditions and increasing throughput

Fans & Underground Ventilation applications:

SINUS PENTA includes:

- ✦ PID functionality using external inputs to accommodate unusual ambient conditions and to adjust the speed of the fan accordingly – i.e. excess CO₂, lack of O₂, dust, smoke, etc
- ✦ Fire mode to allow continuous operation of the drive under normal fault conditions
- ✦ IP 54 enclosures standard up to 132 kW or higher on request to suit underground environments

Regenerative / Active Front End Solutions

Elettronica Santerno provides Regenerative / Active Front end solutions.

The output section utilises a standard Sinus Penta option, whilst the input stage uses standard Sinus Penta hardware with special (RGN) software loaded. By coupling these with some additional line filtering a regenerative/ active front end system can be created.

Benefits of Regenerative/ Active Front End Solutions

Reduction in harmonics:

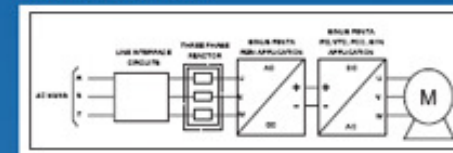
Active front end solutions can be used to reduce harmonics in order to comply with Power Authority requirements.

Energy saving:

Regenerative braking converts mechanical energy from the load into electric energy and regenerates the power back into the mains supplies. This method is far more efficient to the dynamic braking method which converts regenerated energy into heat via brake resistors.

Benefits Include:

- ✦ Reduced energy consumption & operating costs
- ✦ High tolerance against power irregularities and outages
- ✦ Eliminates harmonics



Principle block diagram of the Sinus Penta inverter connection, used as a regenerative feeder, feeding another Sinus Penta controlling the motor.

Flexibility

One drive, many mining applications

Sinus Penta is suited to a range of mining applications including:

- ✦ Hoist / crane
- ✦ Conveyors (belt, roller, screw, cone, jaw, rotary, vertical impact)
- ✦ Elevator
- ✦ Fan (axial, centrifugal, high pressure)
- ✦ Winder (winding / unwinding)
- ✦ Mill (ball, hammer, roller)
- ✦ Pump – bore, centrifugal, positive displacement
- ✦ Vibrating screen
- ✦ Crusher

OTHER APPLICATIONS





**MINING SOLUTIONS
FOR THE 21ST
CENTURY**

SINUS PENTA



690 V for long-haul mining Sizes S65, S70, S75 and S80 One family; A million applications

A major feature of the S65, S70, S75 and S80 Sinus Penta is its suitability for connection to a 690 V AC three-phase supply. The 690 V option is proving particularly popular in the area of underground mining, as it is a practical and cost-efficient supply alternative to conventional 415 V AC or medium voltage (MV) options such as 1100 V AC.

Long feeder runs on larger sized drives in underground mining present unique challenges specifically with regards to conductor size and voltage drop. Traditionally moving to an MV supply has been the only option but this comes at a high switchgear cost.

The 690 V option presents as a unique middle-ground, allowing cost-efficient LV design and switchgear, while almost halving the currents and associated voltage drops. The Sinus Penta is one of only a handful of VSDs that support this important new supply standard.

Reliability – 3 yr warranty

As a result of high calibre design and an ISO 9001 quality program, Elettronica Santerno is able to offer a three year warranty on the Sinus Penta drive range. This provides considerable peace of mind for users, particularly those trying the product for the first time.



NHP
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SANTERNO

FEATURES

1. Wide power and voltage range
49 Power Ratings
From 2.2 to 1140 kW @ 415 V
From 400 to 2010 kW @ 690 V
Allows you to standardise your drive across the entire mining operation.
2. IP 20 and IP 54 standard solutions. IP 54 for dust and water spray protection.
IP 00 and IP 20 available where the drive is to be incorporated into a cabinet solution.
3. Every drive incorporates robust metal enclosure as standard
Will withstand rugged mining applications
4. 4 line user friendly alphanumeric display (standard across range)
Allows easy navigation, configuration, monitoring and parameter storage saving you time.
5. 6 pulse solution is available in all sizes. In larger sizes Sinus Penta is available in 12 or 18 pulse solutions.
Reduce harmonics to meet power authority requirements.
6. Regenerative / Active front end systems
Conserves energy when compared to dynamic braking method and eliminates harmonics.
7. 5 built in control methods (IFD, VTC open and closed loop, FOC, SYN)
The one drive can be adapted to a diverse array of solutions
8. Built in EMC filter
No additional external filtering required saving time, money and space.
9. Extensive I/O with internal comparator functions
Removes the need for additional components.
10. Master Slave Control
For complex torque control applications.