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CS200

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Temperature monitoring, control and analysis system for rotating kilns



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CS200 January 2007

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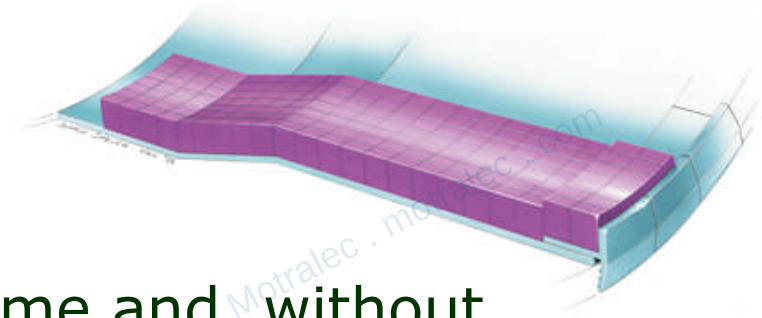
Why Monitor the Kiln Shell



- The kiln shell is a steel tube lined with a ceramic refractory material
- This material degrades over time and, without intervention, will eventually fail catastrophically Changeout is expensive (>$500K) and time consuming
- Extended refractory life leads to lower refractory "cost of ownership"
- Catastrophic failure has to be avoided at all costs

Raytek already has over 170 installations worldwide with legacy product CS100!

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Financial Impact

Example calculation for 35,000 tonne per week cement kiln

Expected refractory life:…… 12 months
Refractory replacement cost:……$550,000
Amortized refractory cost:…… $45,833/month
Life extension through monitoring:.. 3 months
"New" refractory life:…….. 15 months
"New" amortized refractory cost:…. $36,667
Total savings:…… **$9,167/ month**

Duration of non-scheduled shut down:…… 1week
Monthly production rate:…….. 35,000 tonnes
Average selling price:…….. $90/tonne
Total lost revenue:…….. $3,150,000

Catastrophic failure must be avoided at all costs!!!!!

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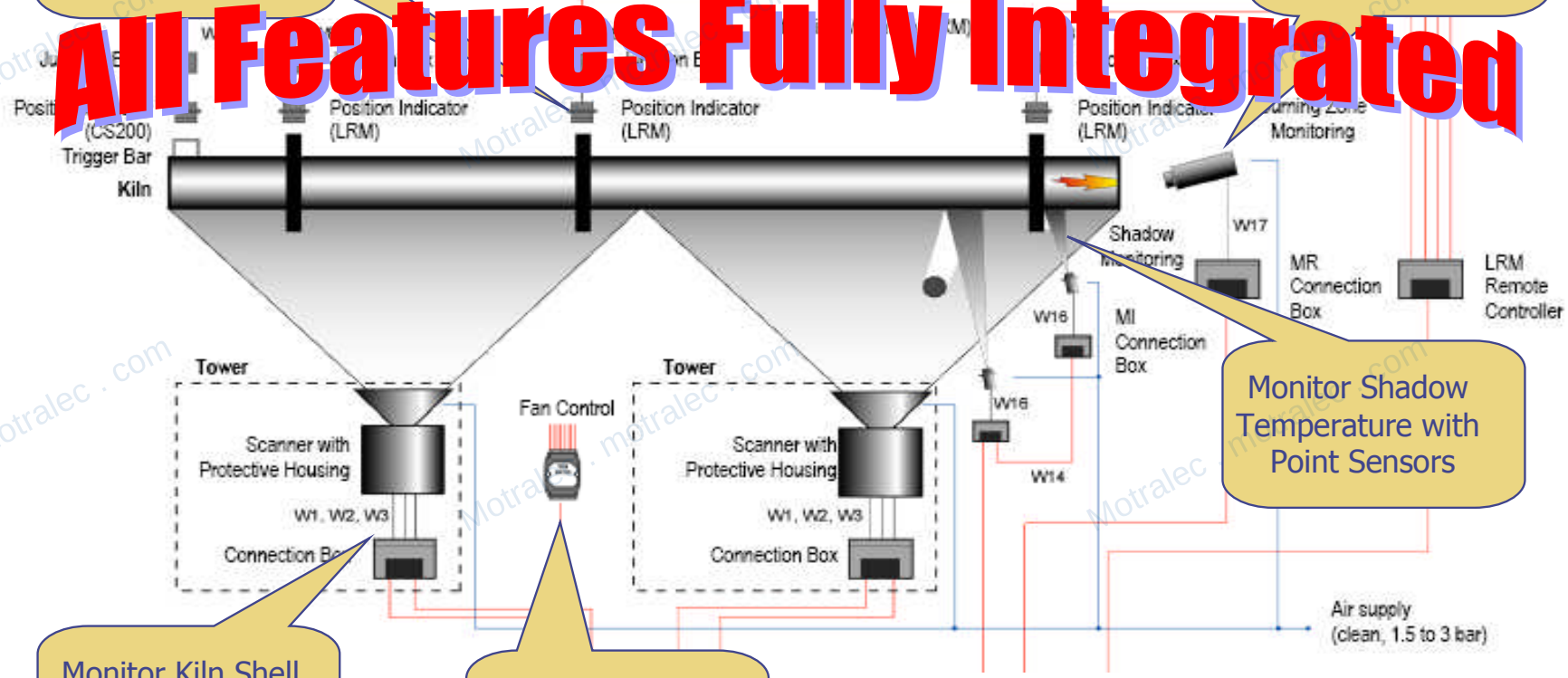
CS200 Kiln Monitoring System

Measure tire slip with Live Ring Migration system

Monitor Burning Zone Temperature with Point Sensor

All Features Fully Integrated



Monitor Shadow Temperature with Point Sensors

Monitor Kiln Shell Temperature Via One or Two Scanners

Control up to 48 Fans

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CS200 Features

- Map entire kiln surface with 2D or 3D view
- “One brick” resolution hot spot detection
- Easy-to-configure alarms
- Fail-Safe “hot spot” alarm outputs (PC independent)
- Zooming to give exploded-views for small areas
- History files contain all data – thermogram, alarms, errors, etc.
- Slow motion movies of historical data for trend analysis
- Multi-level password protection
- Refractory management screen for refractory life optimization
- Supports 2 scanners for long kilns, up to 32 shadow sensors, Live Ring Migration up to 6 tires, burning zone sensor and fan control up to 48 unique zones simultaneously.

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CS200 Highlights

- **Live Ring Migration** integrated into main program
- **Fan Control** with 48 alarm zones and digital output capability
- **Shadow Monitoring** measures temperature in shadows caused by kiln tires, buildings or other obstructions – data is completely integrated into one thermogram
- **Burning Zone Monitoring** via two-color point sensor
- Embedded **OPC** server for interfacing to other control systems
- **Dirty lens alarm** for shadow pyrometer and scanner
- Better database security with SQL server

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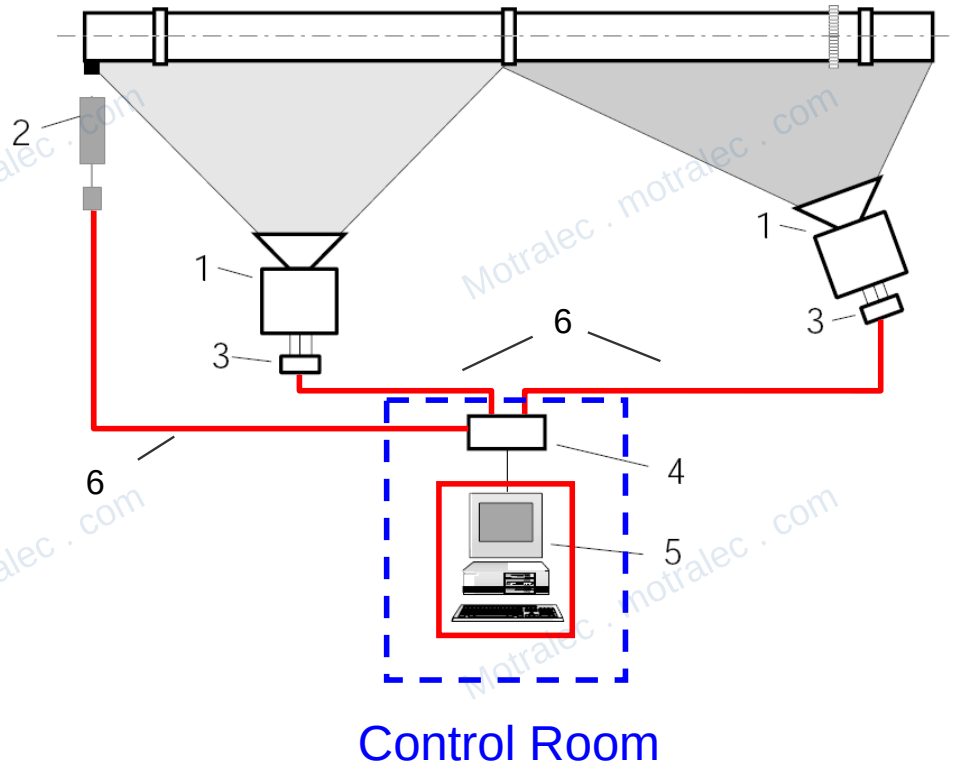
CS200 Standard



1. Protective housing with linescanner
2. Position indicator
3. Scanner connection box
4. CS200 interface box

5. PC (customer)
6. Field cable (customer)

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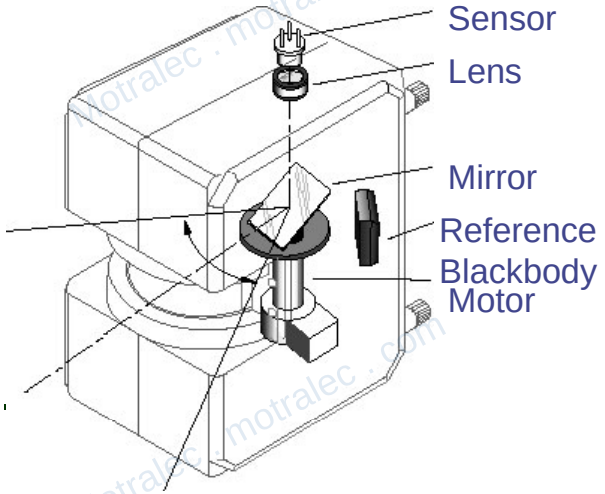
Key Components

MP50 Linescanner

- Rotating motor scans through 90° Field of View
- IR radiation collected at 1,024 points within the 90° field-of-view, displayed for 256 points
- Analog outputs are generated directly from scanner on a sector-by-sector basis
- Built-in air purge & water cooling
- Brushless scanning motor (4.6 yr MTBF)



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Key Components

Protective Housing





- Rugged stainless steel housing with air purge & 3D-adjustable mounting base
- Mounted on tower or building and connected to control room via prewired connection boxes
- Available with optional vortex cooler kit – extends allowable ambient temperature up to 75°C (167°F)

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Key Components

Interface Box



Front side



Rear side

- Supplies power to linescanner and position indicator
- Converts RS485 communications to PC's RS232 serial port
- Located in control room providing convenient location to land field wiring and to monitor system status

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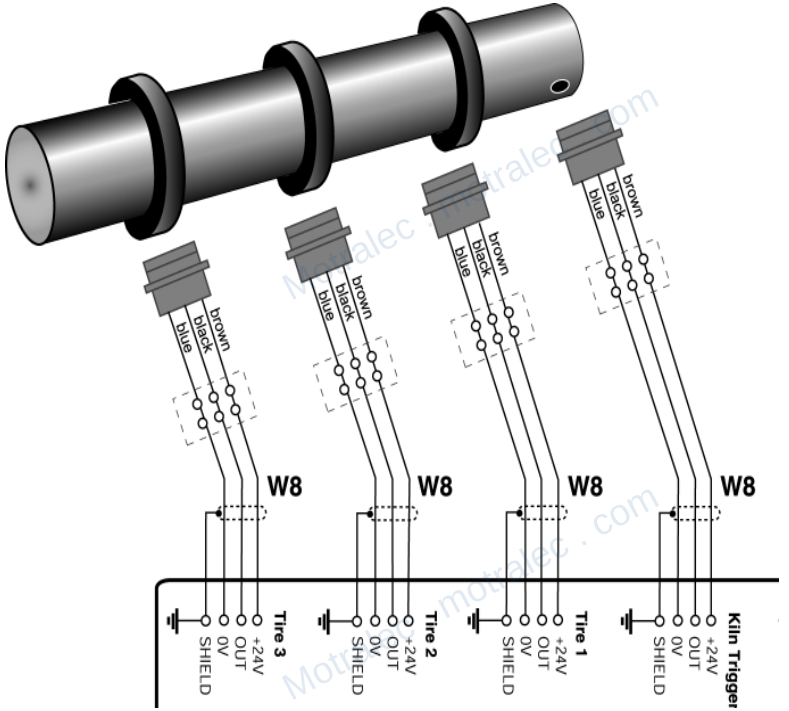
Accessory: Live Ring Migration

- Monitors “creep” of the kiln and prevents mechanical damage to refractory
- Measures differences in rotation time between the kiln shell and each tire
- Consists of: LRM remote controller and 3 position indicators
- Additional position indicators available to extend to 6 tires for longer kilns



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Accessory: FanControl

- Assists in preventing kiln shell deformation with active cooling via multiple fans
- Software controlled turn on/off for up to 48 fans
- Consists of: one digital output module (16 channels)
- Multiple modules can be networked for increased output channels



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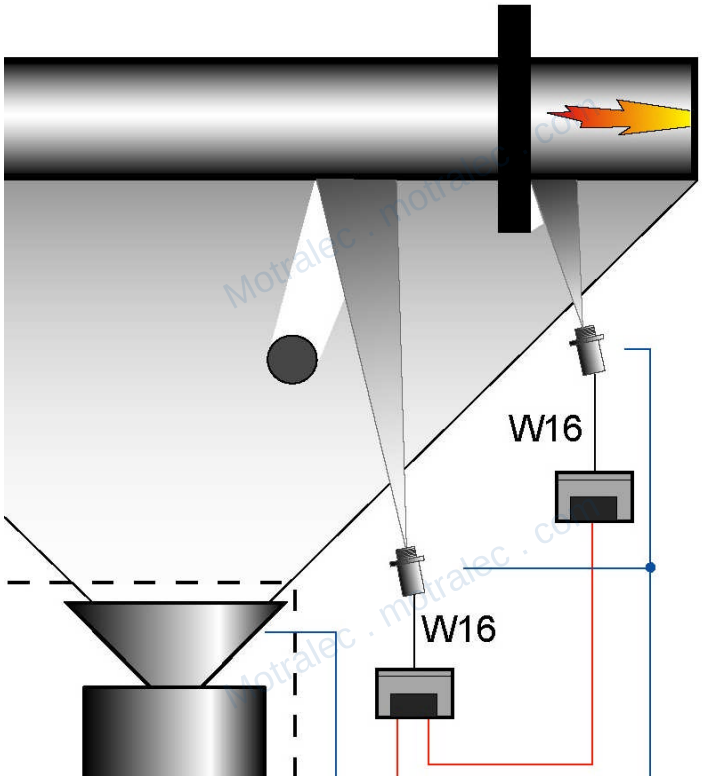
Accessory: Shadow Monitoring

- Monitors shadows created by kiln tires and other immoveable objects
- Thermal data is incorporated with linescanner data into one seamless thermogram
- Standard package consists of: MIH10, air purge, adjustable mounting bracket, MI connection box
- Other RAYTEK point sensors can be substituted for unique applications
- Multi-drop up to 32 sensors to monitor multiple shadows



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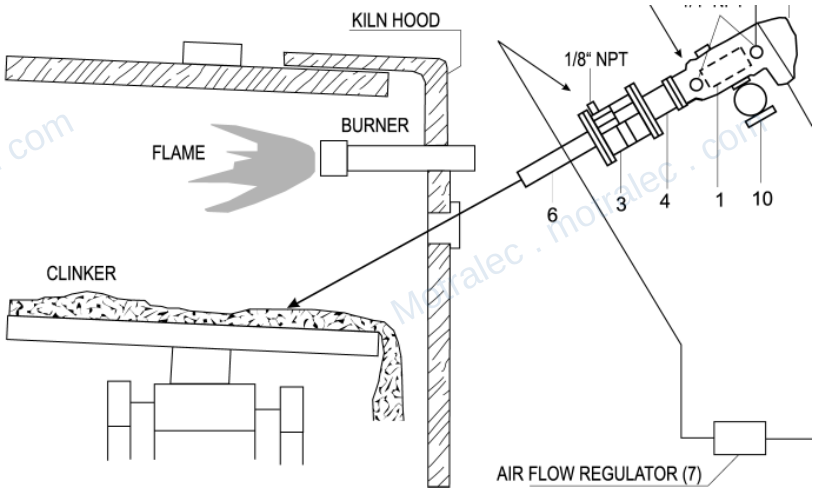
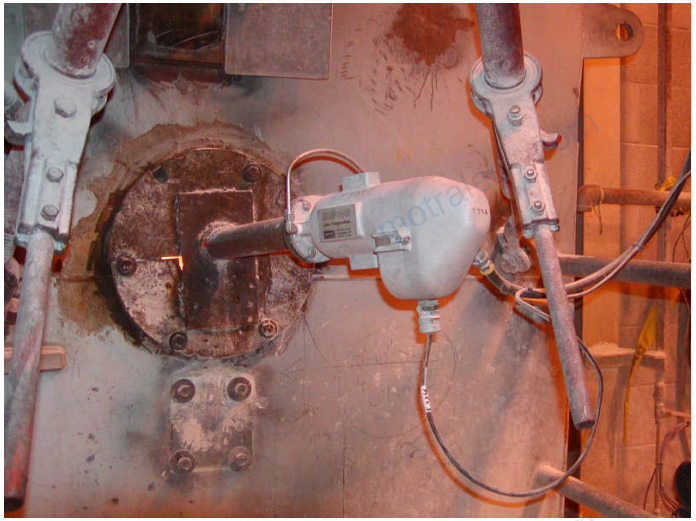
Accessory: Burning Zone Monitoring





- Monitors the burning zone of the kiln
- Consists of: two-color point sensor MR, ThermoJacket, blast gate, sighting tube, adjustable mounting bracket, MR connection box
- Data is displayed alongside kiln surface data on one screen

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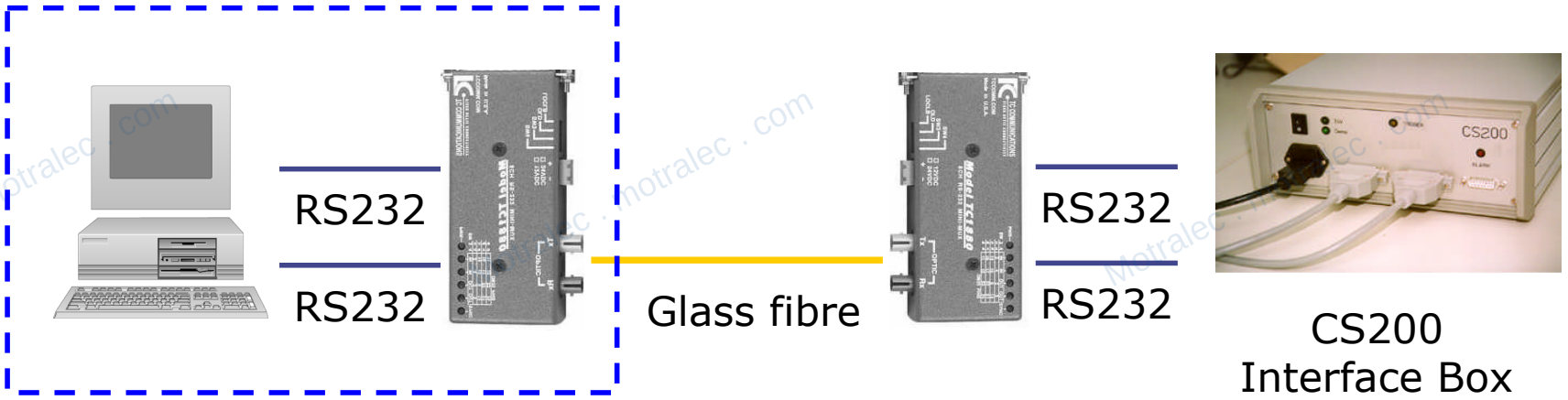
Accessory: Fibre Optic Kit



- Insures reliable communication in critical locations (lightening, grounding or EMI problems) by replacing the copper field cables
- Provides 4 separate COM channels (2x scanner, 2 remaining channels for two accessories
- CS200 Interface Box must be housed in a protected area in the field!

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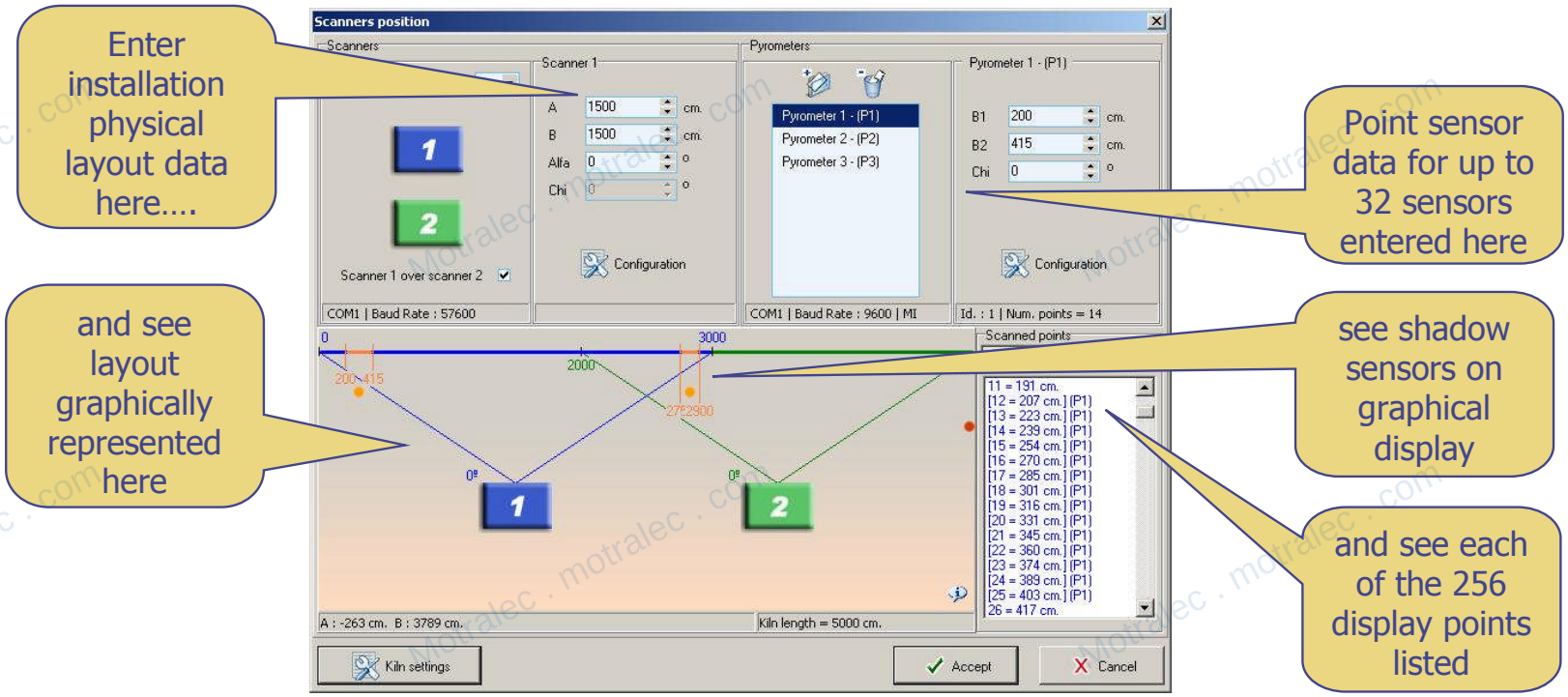
Software Features



Configure scanners and shadow sensors from one, user-friendly user interface

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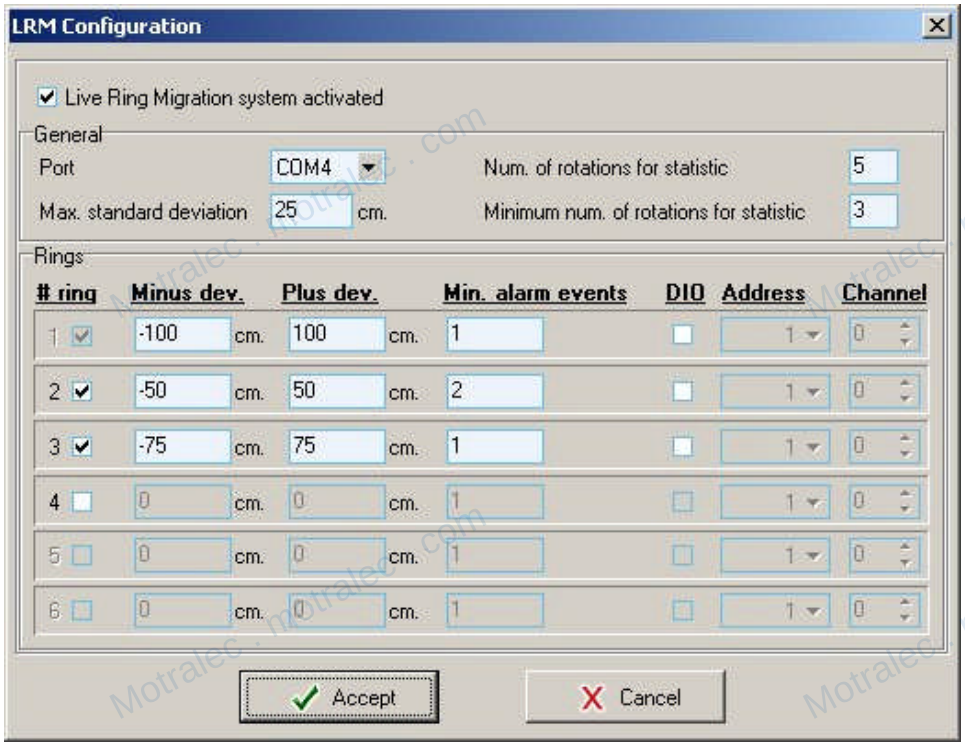
Software Features



LRM configured within CS200 software

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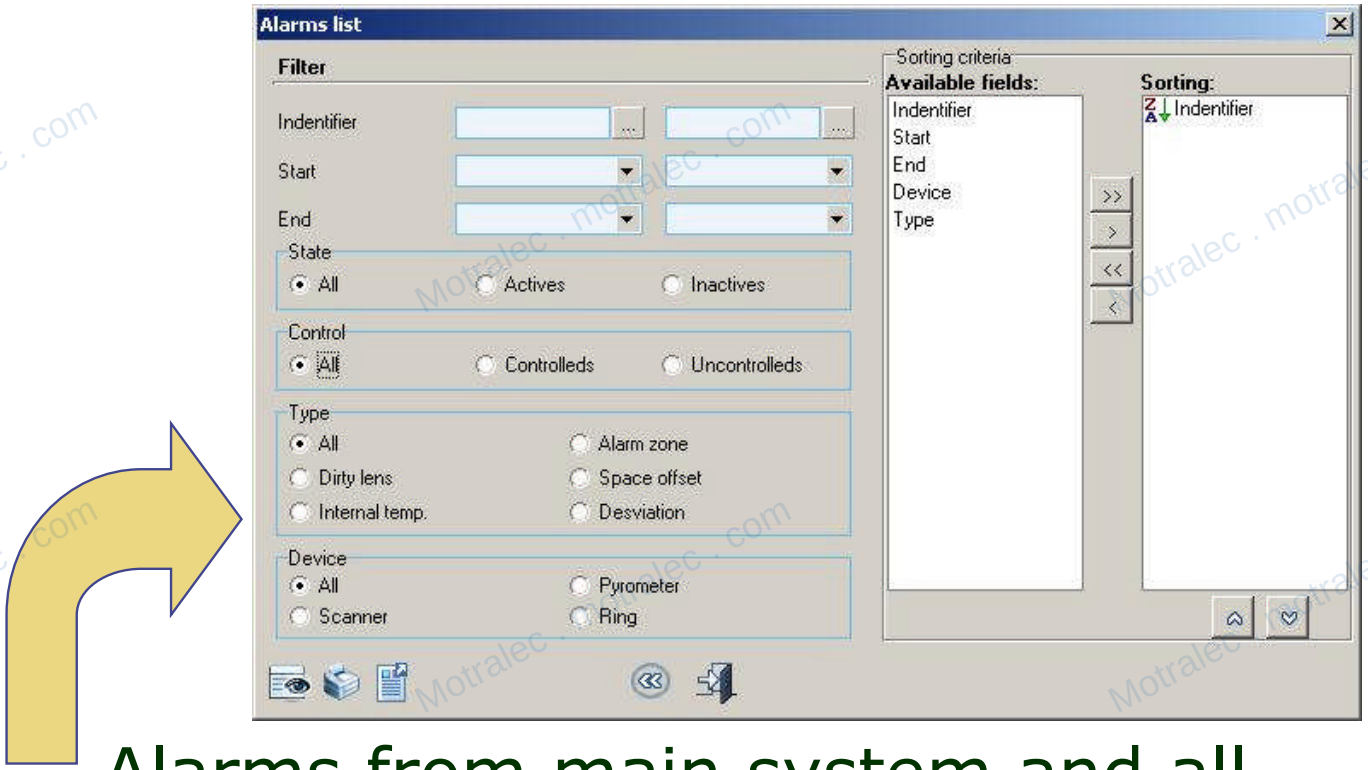
Software Features



Alarms from main system and all accessories on one log – fully sortable and exportable to other programs

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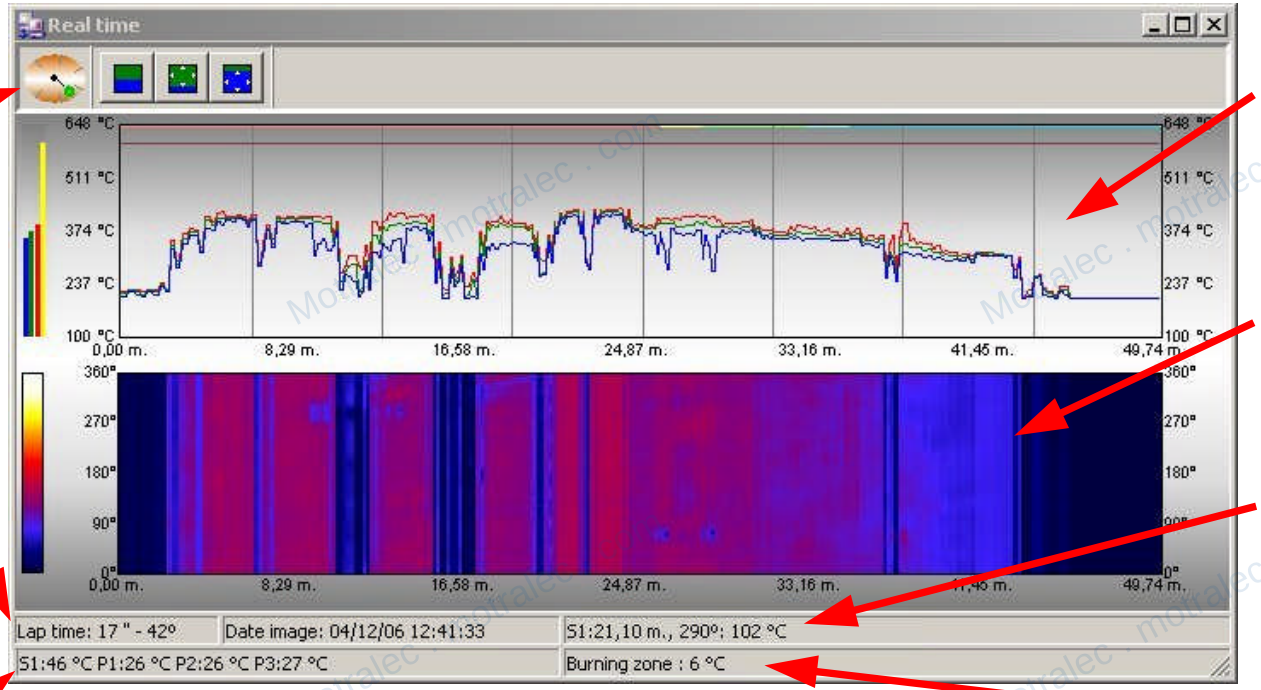
Software Features



Angle of rotation

Rotational speed

IR sensor internal temps

Temp. data line graph

Temp. data thermogram

Temp. at cursor

Burning zone temp.

One screen shows temp. data and all needed information to monitor kiln and CS200 system condition.

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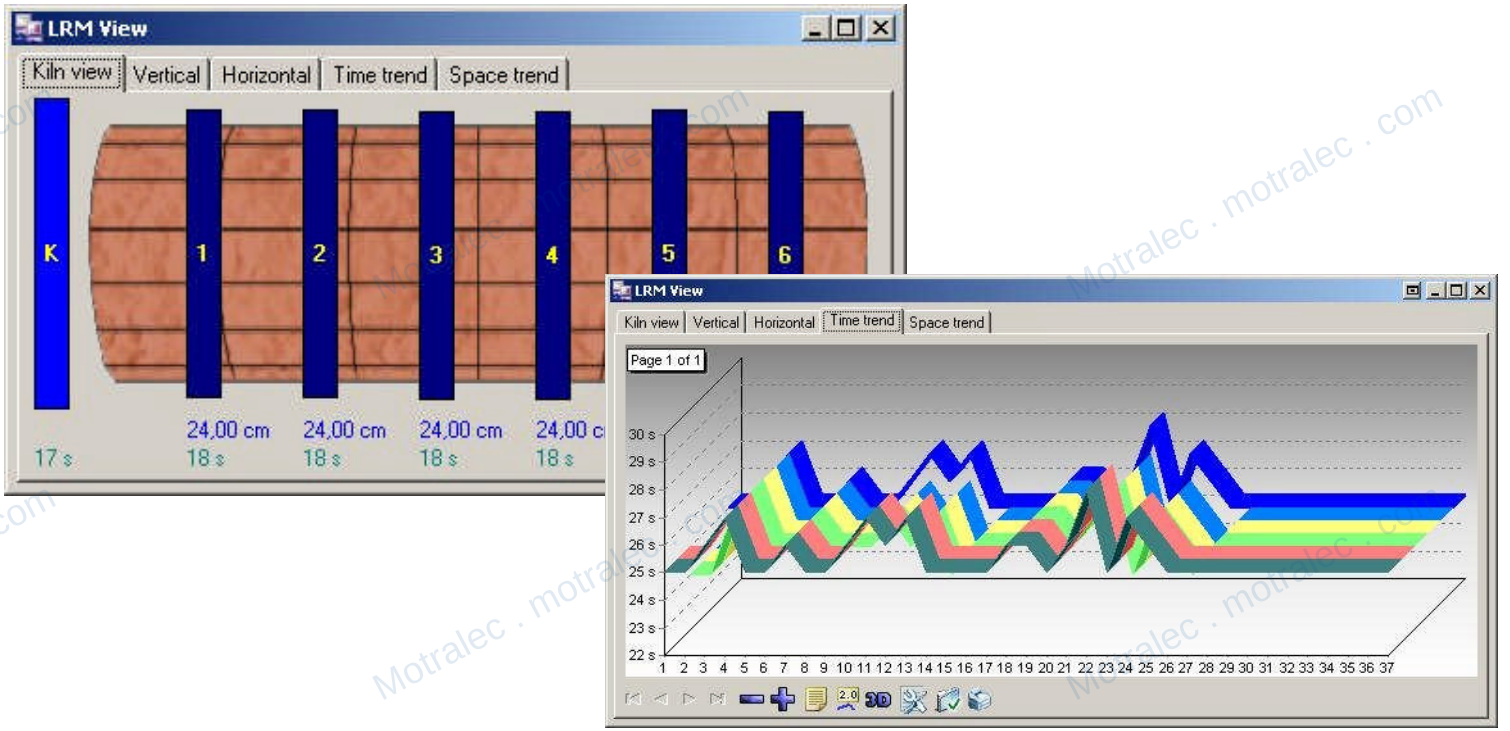

LRM data viewable directly from CS200 screens with multiple choices for data presentation

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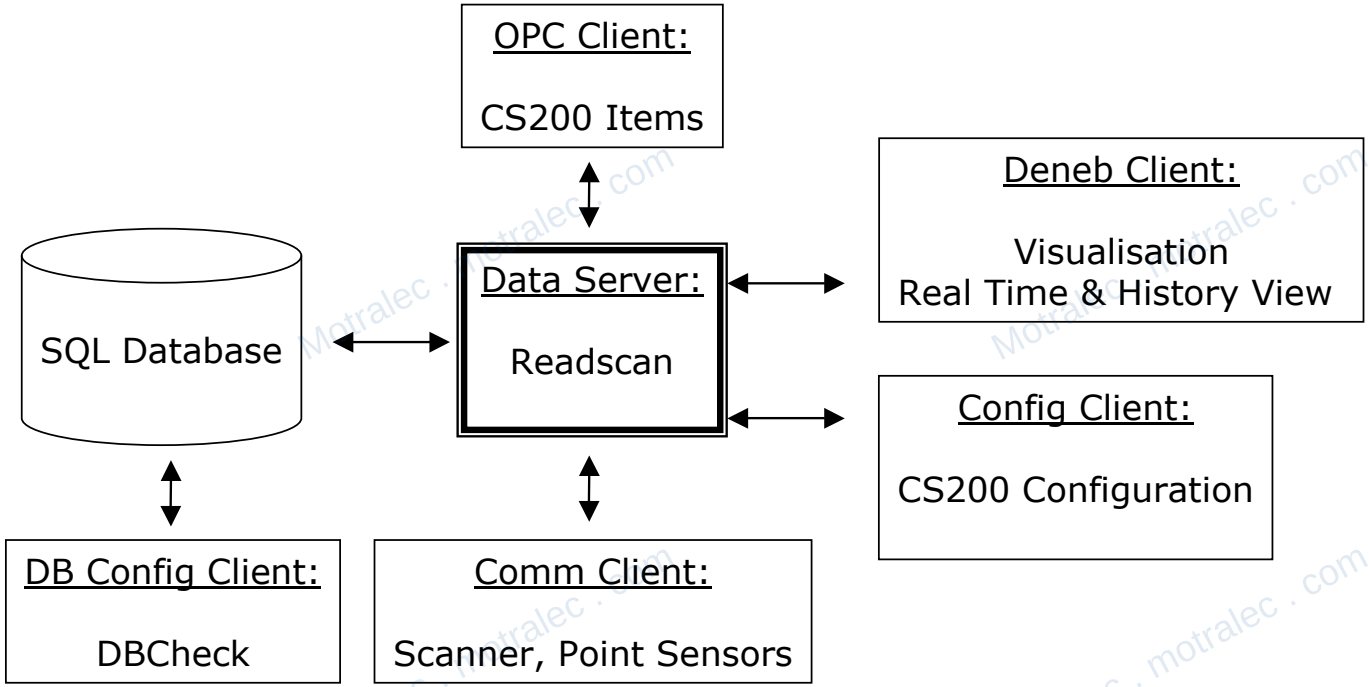
CS200 Software Structure



Software has server / client structure

- Readscan is the server and runs all system tasks such as communication, data interpretation and interfacing with output modules
- Deneb is the client and displays the physical state of the different devices, as well as recover historical data from the system

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Upgrades for CS100 Users

- Software upgrades are available and automatically provide:
  - OPC server capability,
  - Improved historical data management
  - Completely new “look and feel”
- The CS100 Interface Box will not work this the CS200 Upgrade
  - The CS200 Interface Box is required
- Integrating the accessories (LRM, shadow monitoring, etc.) requires the Module Interface Box

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CS200 Summary

- Map **entire kiln surface** with 2D or 3D view with **"One brick" resolution** hot spot detection
- Easy-to-configure alarms & **Fail-Safe** "hot spot" alarm outputs
- Zooming to give **exploded-views** for small areas
- Fully integrated **Live Ring Migration, Fan Control, Shadow Monitoring & Burning Zone Monitoring**
- Embedded **OPC** server for interfacing to other control systems
- **Dirty lens alarm** for shadow pyrometer and scanner

- Supports 2 scanners for long kilns, up to 32 shadow sensors, Live Ring Migration up to 6 tires, burning zone sensor and fan control up to 48 unique zones simultaneously

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Raytek CS 200

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- Devis rapide et conseil technique par nos spécialistes
- Plus de 200 000 références et 30 marques distribuées
- Vente, réparation, bobinage et SAV en atelier
- Livraison partout en France, accompagnement avant et après-vente

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