# Equipment Condition Monitoring System

## Sensors to On Board Computer

TLC ENGINEERING SOLUTIONS (Pty) Ltd

# System Topology

- Sensors
- Signal Conditioning
- Digitiser
- Industrial Ethernet
- On-board Computer

SENSORS

24 CH DIGITAL INPUT UNIT

24 CH ANALOG INPUT UNIT

24CH DIGITAL INPUT UNIT (6E ONLY)

SENSOR AND DIGITISERS

Industrial Ethernet Switch

Fiber

Industrial Ethernet Switch

ON BOARD COMPUTER

## SYSTEM INTERCONNECTION DIAGRAM

# Sensors

- Industry standard outputs
- Analog – 4 to 20mA or mV output
- Digital – Voltage inputs / Contact
- Signal Isolation requirement
- Equipment Sensors

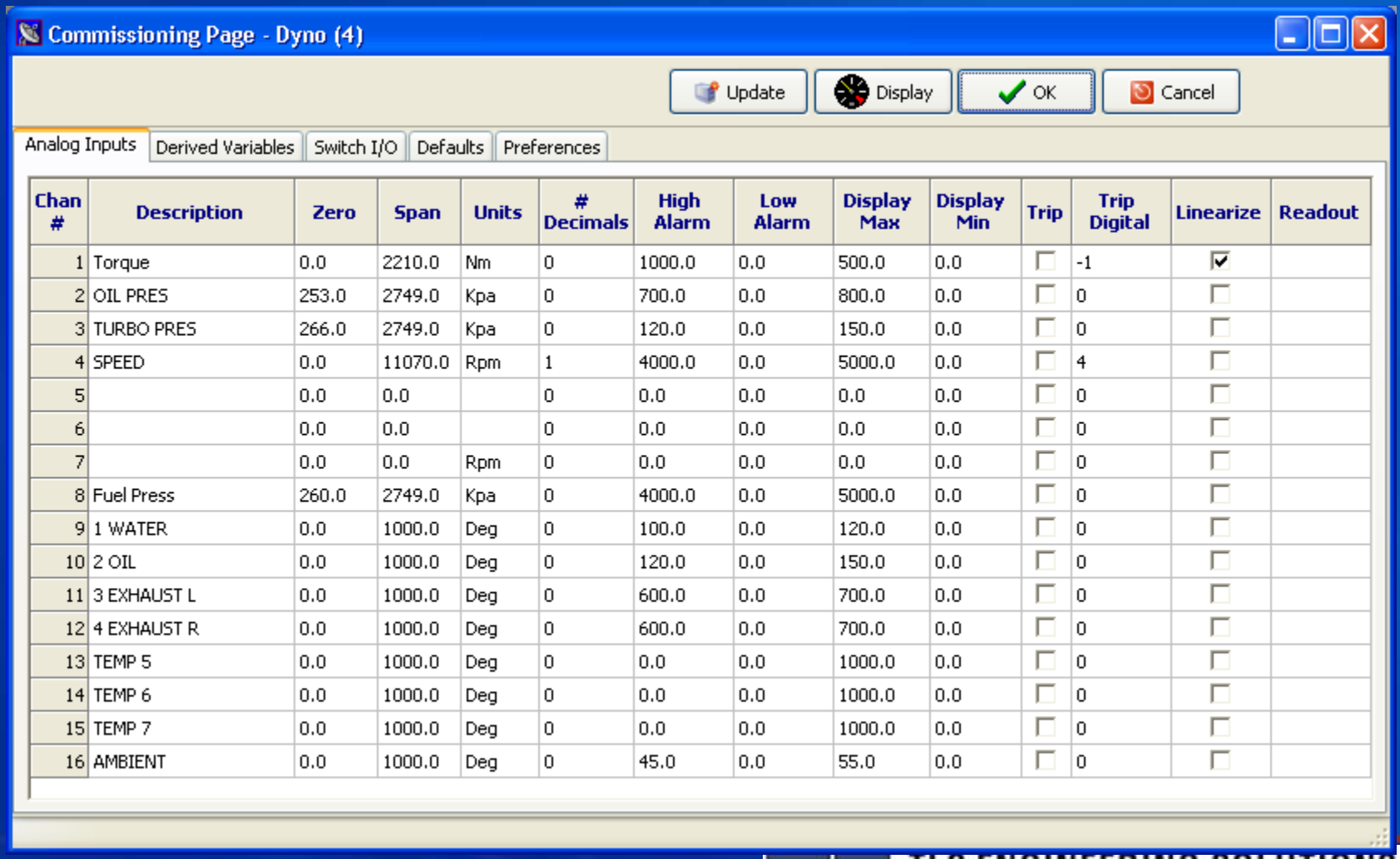
# Signal Conditioning

- Accept sensor inputs
- Provide signal conditioning and isolation
- Provide rapid connection and disconnection for short MTTR

# Digitiser

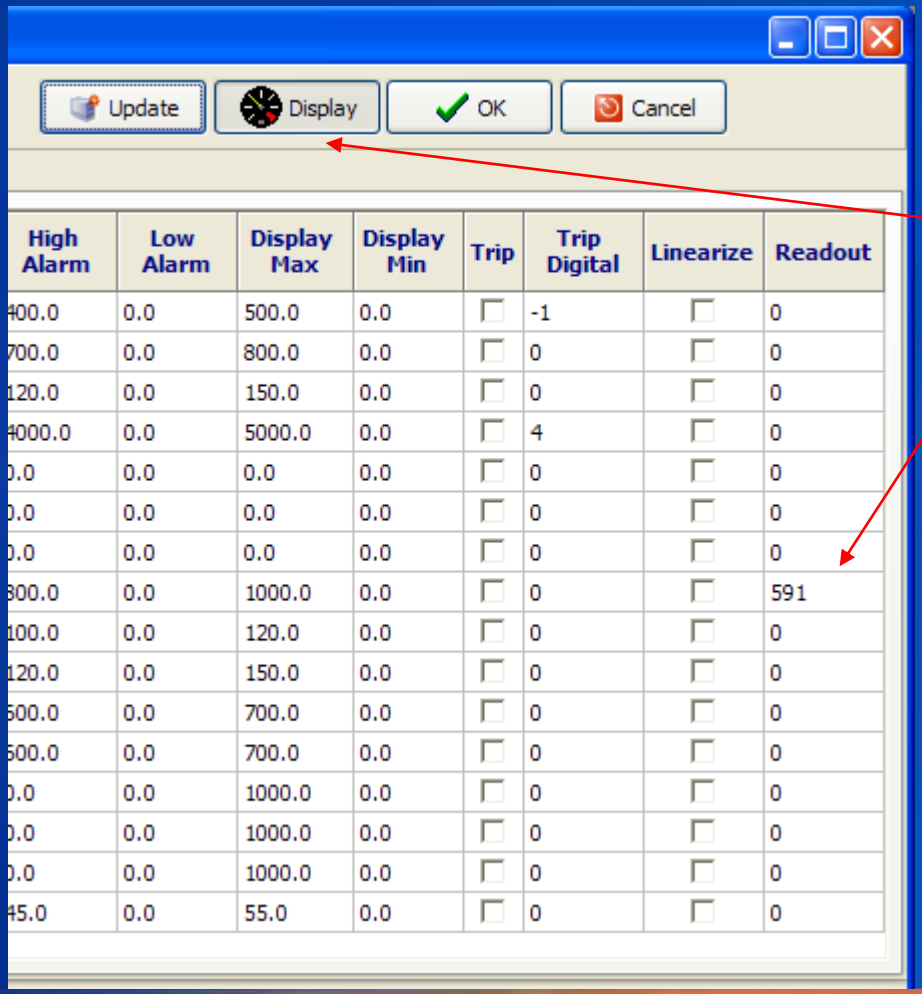
- Multiple (24) analog or digital inputs
- Modular – open system
- On board memory for local storage
- Optional local display for diagnostics and commissioning
- Standard TCP/IP connection

# Digitiser Setup - Network




| Chan # | Description | Zero | Span | Units | # Decimals | High Alarm | Low Alarm | Display Max | Display Min | Trip | Trip Digital | Linearize | Readout |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Torque | 0.0 | 2210.0 | Nm | 0 | 1000.0 | 0.0 | 500.0 | 0.0 | ☐ | -1 | ☑ | |
| 2 | OIL PRES | 253.0 | 2749.0 | Kpa | 0 | 700.0 | 0.0 | 800.0 | 0.0 | ☐ | 0 | ☐ | |
| 3 | TURBO PRES | 266.0 | 2749.0 | Kpa | 0 | 120.0 | 0.0 | 150.0 | 0.0 | ☐ | 0 | ☐ | |
| 4 | SPEED | 0.0 | 11070.0 | Rpm | 1 | 4000.0 | 0.0 | 5000.0 | 0.0 | ☐ | 4 | ☐ | |
| 5 | | 0.0 | 0.0 | | 0 | 0.0 | 0.0 | 0.0 | 0.0 | ☐ | 0 | ☐ | |
| 6 | | 0.0 | 0.0 | | 0 | 0.0 | 0.0 | 0.0 | 0.0 | ☐ | 0 | ☐ | |
| 7 | | 0.0 | 0.0 | Rpm | 0 | 0.0 | 0.0 | 0.0 | 0.0 | ☐ | 0 | ☐ | |
| 8 | Fuel Press | 260.0 | 2749.0 | Kpa | 0 | 4000.0 | 0.0 | 5000.0 | 0.0 | ☐ | 0 | ☐ | |
| 9 | 1 WATER | 0.0 | 1000.0 | Deg | 0 | 100.0 | 0.0 | 120.0 | 0.0 | ☐ | 0 | ☐ | |
| 10 | 2 OIL | 0.0 | 1000.0 | Deg | 0 | 120.0 | 0.0 | 150.0 | 0.0 | ☐ | 0 | ☐ | |
| 11 | 3 EXHAUST L | 0.0 | 1000.0 | Deg | 0 | 600.0 | 0.0 | 700.0 | 0.0 | ☐ | 0 | ☐ | |
| 12 | 4 EXHAUST R | 0.0 | 1000.0 | Deg | 0 | 600.0 | 0.0 | 700.0 | 0.0 | ☐ | 0 | ☐ | |
| 13 | TEMP 5 | 0.0 | 1000.0 | Deg | 0 | 0.0 | 0.0 | 1000.0 | 0.0 | ☐ | 0 | ☐ | |
| 14 | TEMP 6 | 0.0 | 1000.0 | Deg | 0 | 0.0 | 0.0 | 1000.0 | 0.0 | ☐ | 0 | ☐ | |
| 15 | TEMP 7 | 0.0 | 1000.0 | Deg | 0 | 0.0 | 0.0 | 1000.0 | 0.0 | ☐ | 0 | ☐ | |
| 16 | AMBIENT | 0.0 | 1000.0 | Deg | 0 | 45.0 | 0.0 | 55.0 | 0.0 | ☐ | 0 | ☐ | |

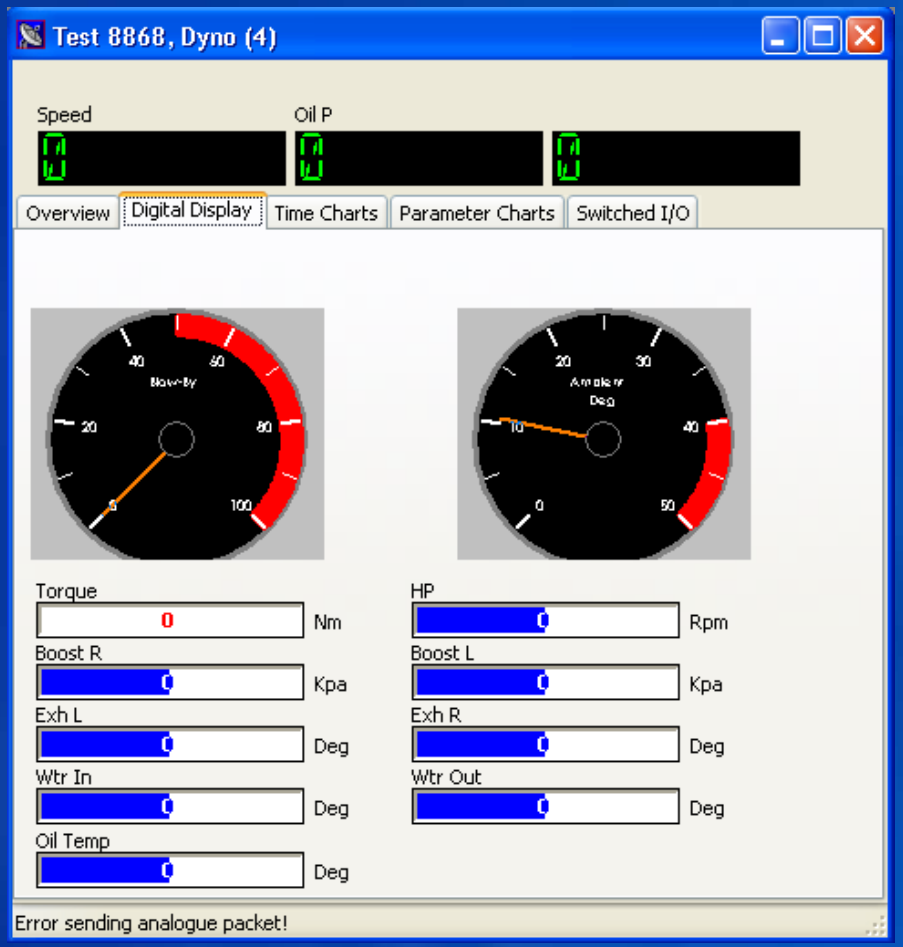
# Diagnostics



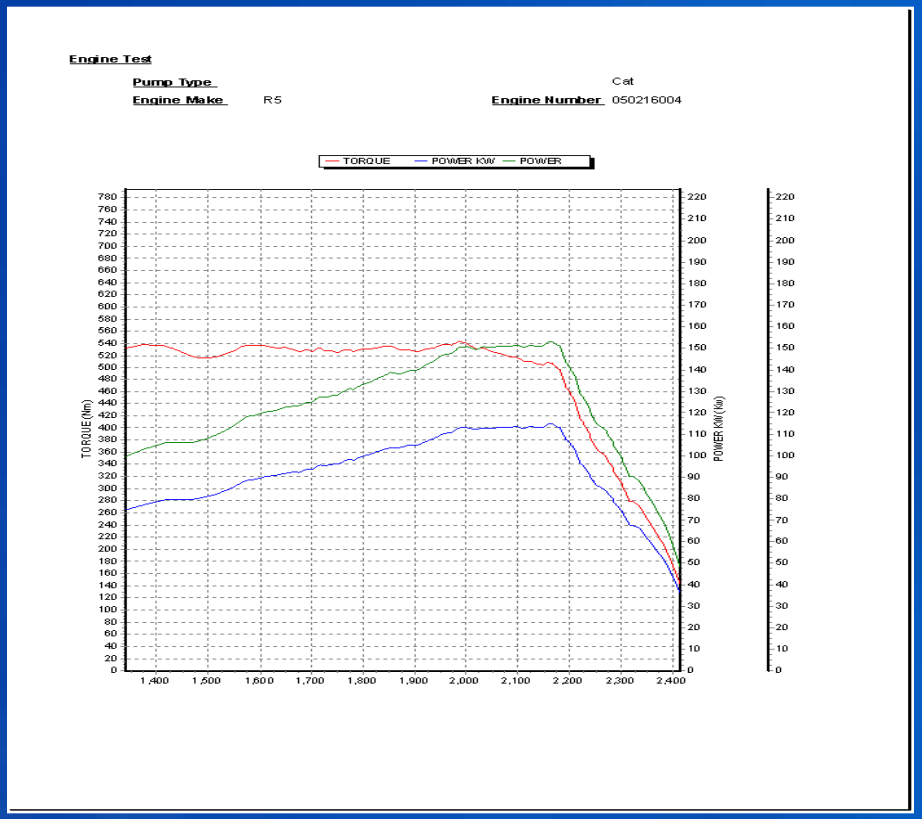

| High Alarm | Low Alarm | Display Max | Display Min | Trip | Trip Digital | Linearize | Readout |
|---|---|---|---|---|---|---|---|
| 400.0 | 0.0 | 500.0 | 0.0 | ☐ | -1 | ☐ | 0 |
| 700.0 | 0.0 | 800.0 | 0.0 | ☐ | 0 | ☐ | 0 |
| 120.0 | 0.0 | 150.0 | 0.0 | ☐ | 0 | ☐ | 0 |
| 4000.0 | 0.0 | 5000.0 | 0.0 | ☐ | 4 | ☐ | 0 |
| 0.0 | 0.0 | 0.0 | 0.0 | ☐ | 0 | ☐ | 0 |
| 0.0 | 0.0 | 0.0 | 0.0 | ☐ | 0 | ☐ | 0 |
| 0.0 | 0.0 | 0.0 | 0.0 | ☐ | 0 | ☐ | 0 |
| 800.0 | 0.0 | 1000.0 | 0.0 | ☐ | 0 | ☐ | 591 |
| 100.0 | 0.0 | 120.0 | 0.0 | ☐ | 0 | ☐ | 0 |
| 120.0 | 0.0 | 150.0 | 0.0 | ☐ | 0 | ☐ | 0 |
| 500.0 | 0.0 | 700.0 | 0.0 | ☐ | 0 | ☐ | 0 |
| 500.0 | 0.0 | 700.0 | 0.0 | ☐ | 0 | ☐ | 0 |
| 0.0 | 0.0 | 1000.0 | 0.0 | ☐ | 0 | ☐ | 0 |
| 0.0 | 0.0 | 1000.0 | 0.0 | ☐ | 0 | ☐ | 0 |
| 0.0 | 0.0 | 1000.0 | 0.0 | ☐ | 0 | ☐ | 0 |
| 45.0 | 0.0 | 55.0 | 0.0 | ☐ | 0 | ☐ | 0 |

Live data from sensors

# Real Time Display



# Historic Data from Buffer



# Power Supply

- Standard 90V to 260V AC to 12V DC power supply
- Backup 12V battery
- Additional surge suppression unit on power supply input

# Industrial Ethernet

- Local hub with up to 4 device inputs
- Fibre optic connection

# Product Accreditation

| | | | |
|---|---|---|---|
| | Sensors | Pressure / Vacuum | CE<br>Withstands free fall to IEC 68-2-32 procedure 1 IP65 |
| | | Current | CE / EN50155 |
| | | Voltage | CE / EN50178 |
| | | Digital Inputs | UL 1577,component recognition program, File E55361; CSA Component Acceptance Notice #5, File CA88324. |
| | | Temperature | CE |
| | | Vibration | CE |
| | Power Supply | Mains to 12V DC Power supply. Used to power sensors and data acquisition equipment | CE |
| | Surge Arrestors | Surge arrestor used on input to power supply used to power equipment | KEMA, MEEI, UL (File No. E168805) E DIN VDE 0675-6:1989-11 and -6/A1:1996-03 |
| | Network | Unmanaged Industrial ETHERNET Rail Switch, store and forward switching mode, Ethernet (10 Mbit/s) and Fast-Ethernet (100 Mbit/s) | IEC 60068-2-27 shock 15 g, 11 ms duration, 18 shocks IEC 60068-2-6 vibration 1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; IEC 60068-2-6 vibration 1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.;EN 61000-4-2 electrostatic discharge (ESD) 6 kV contact discharge, 8 kV air discharge; EN 61000-4-3 electromagnetic field 10 V/m (80 - 1000 MHz); EN 61000-4-4 fast transients (burst) 2 kV power line, 1 kV data line; EN 61000-4-3 electromagnetic field 10 V/m (80 - 1000 MHz) |
| | Data Logger | 24 Channel Analog or Digital Input Ethernet based signal conditioning and digitiser system | Approvals to IEC60571 & EN 50121-3-2 - EMC EN50121-3-2. |

# Summary

- Remote measurement of sensor data
- Modular open systems outstation units
- Interconnection via standard Ethernet TCP/IP to on-board computer
- Redundant memory for event roll back
- Solution is locally developed and can be customised to current and future requirements

# Contact Details

For more information contact:

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