RUGGED MoNITORING

MONITORING SIMPLIFIED

T501
SMART
TRANSFORMER MONITOR

ROBUST | RELIABLE | RESPONSIVE

T501 MONITORING FUNCTIONS

Real Time Monitoring and Advance Control

Transformer Monitoring Software

Transformer Health Assessment

- Remote Monitoring and Control
- Insulation Life Estimation
- Overload Capacity
- Bubbling Temperature
- Moisture in Insulation
- Real time Alarm and Notifications
- Easy Integration

Direct Winding Hot Spot

- HV Winding
- LV Winding
- MV Winding
- Core Hot Spot

Bushing Monitoring Integration

- Leakage Current
- TanDelta
- Power Factor
- Capacitance

Partial Discharge (PDM) Integration

- PD Amplitude
- PD Discharge Rate
- PD Trend

Cooling Control

- Fan/Pump Status
- Fan Bank Motor Current
- Cooling Efficiency
- Fan bank Exercise

Dissolved Gas analyzer Integration

- Single gas DGA
- Multi-gas DGA
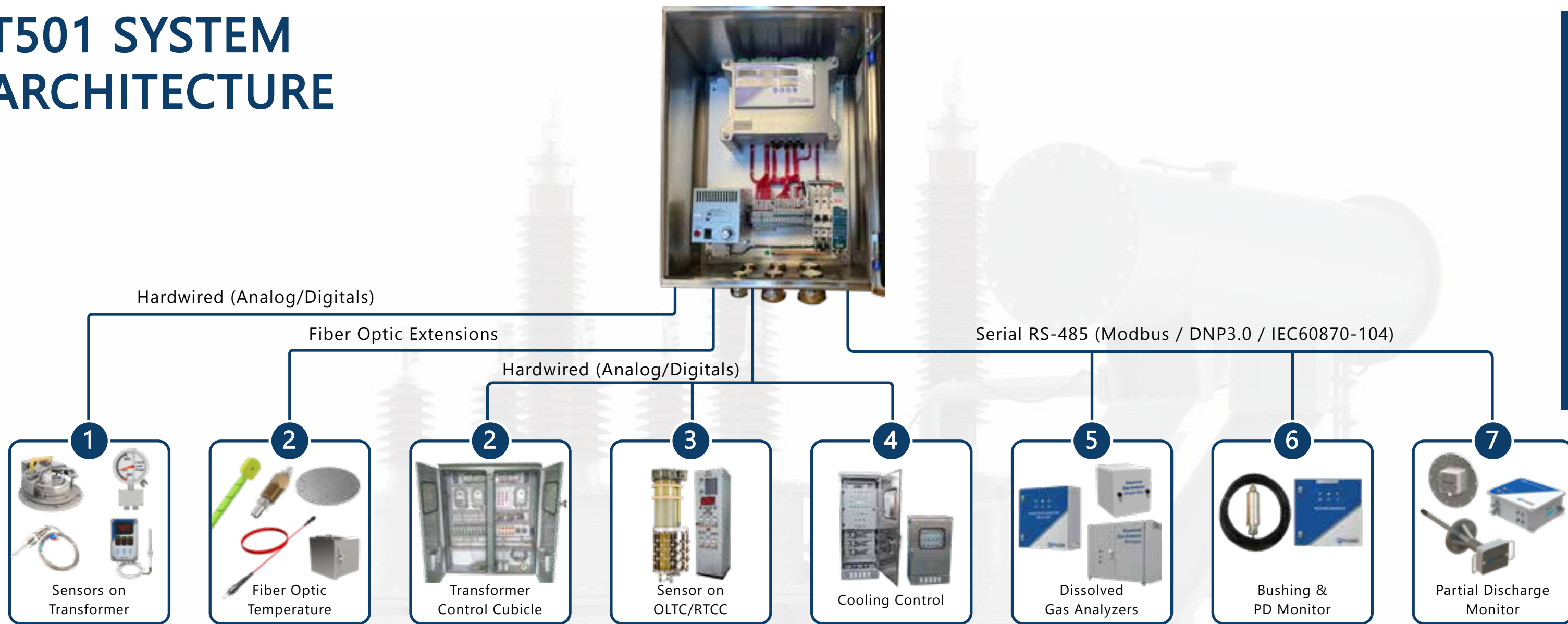- Moisture

Transformer Monitoring

- Oil Temperature
- Winding Temperature
- Load Current
- OLTC Tap Position
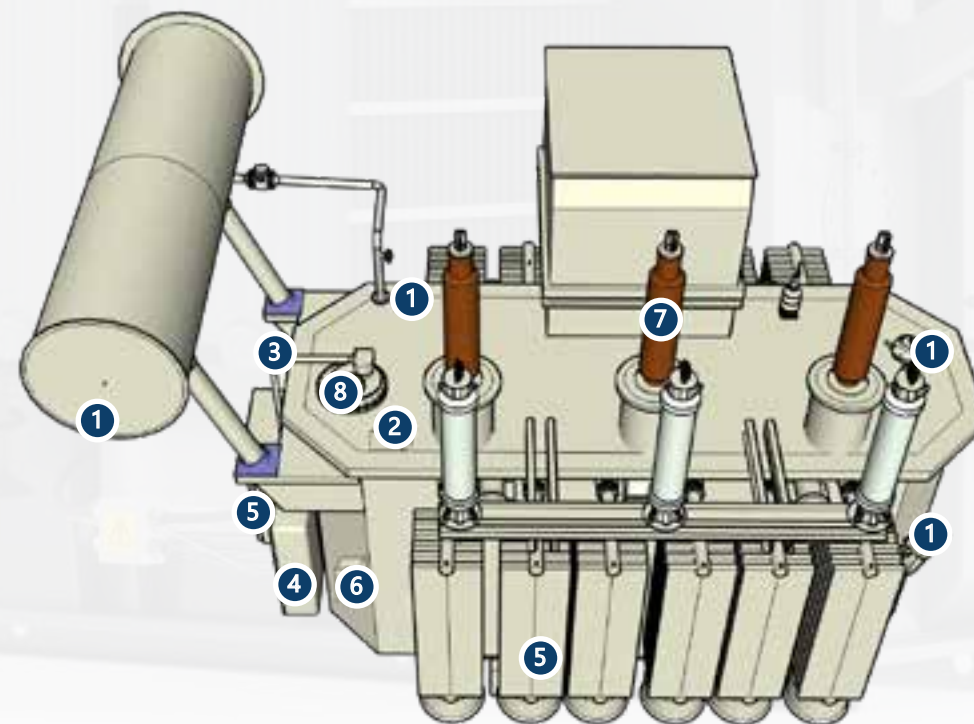- Liquid Level
- Tank Pressure

OLTC Monitoring

- Oil Temperature
- Oil Level
- OLTC Tap Position
- OLTC Motor Current
- Contact Wear

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T501 SYSTEM ARCHITECTURE

Hardwired (Analog/Digitals)

Fiber Optic Extensions

Serial RS-485 (Modbus / DNP3.0 / IEC60870-104)

Hardwired (Analog/Digitals)

| 1 | 2 | 2 | 3 | 4 | 5 | 6 | 7 |

Sensors on Transformer — Fiber Optic Temperature — Transformer Control Cubicle — Sensor on OLTC/RTCC — Cooling Control — Dissolved Gas Analyzers — Bushing & PD Monitor — Partial Discharge Monitor

1. OTI,WTI, RTD, PRD, Breather, Buchholz Relay, LLG/OLI, Pressure Sensor etc.
2. Direct winding Hot Spot Monitor
3. Transformer Control Cubicle
4. OLTC and RTCC Panel
5. Cooling System and Control Cabinet
6. Dissolved Gas Analyzer
7. Bushing Monitoring
8. Partial Discharge Monitor

Certifications

- ATEX
- Lloyds
- CE / RoHs

Variants

- Offshore / Marine
- Ethernet Redundancy: PRP
- Enterprise Monitoring Software

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T501 FEATURES
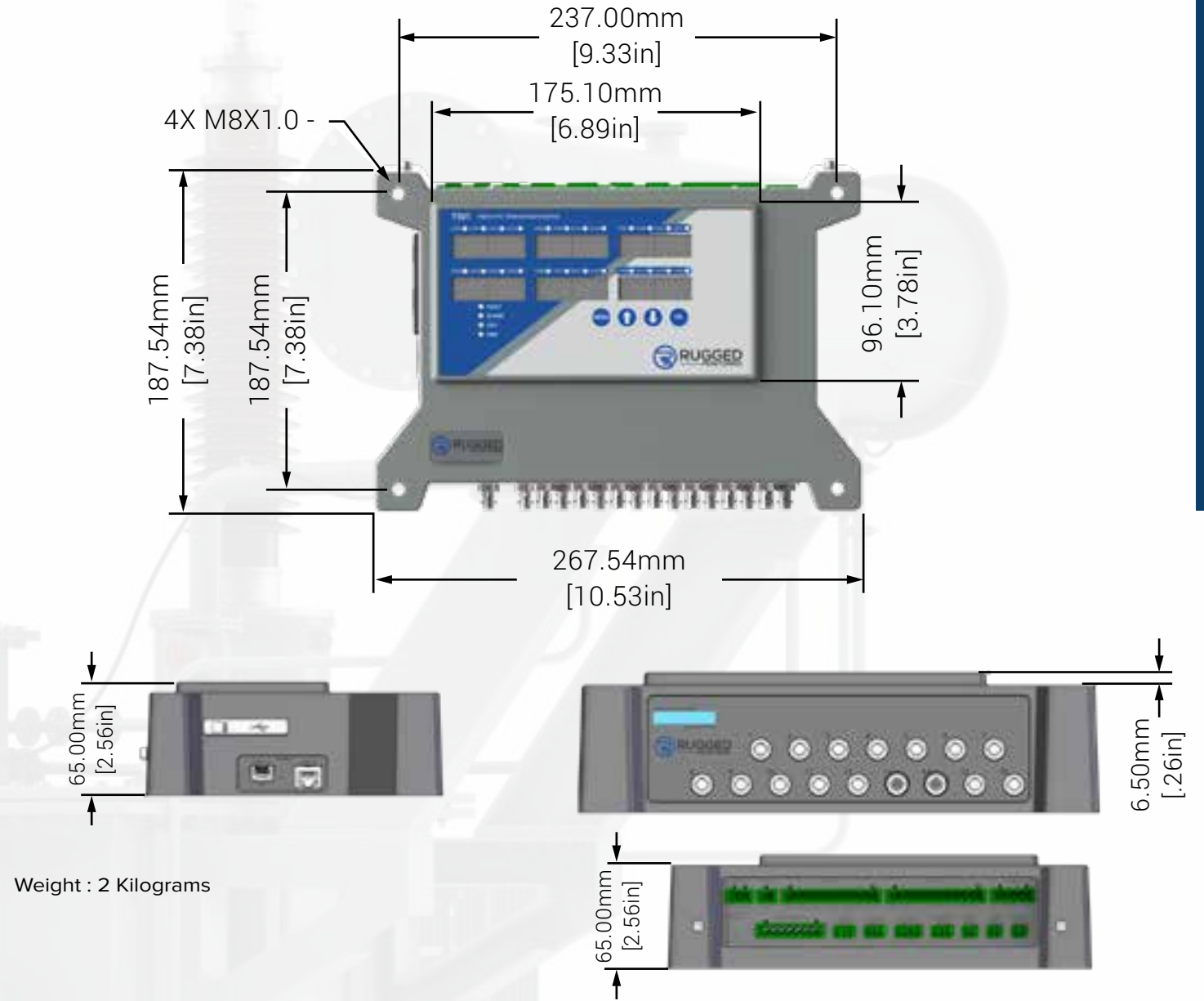
Comprehensive Features to Meet Market Demand

RUGGED CONNECT SOFTWARE

- Desktop and Web Client
- Remote Configuration
- Advanced Visualization
- Data Logging, Reporting
- Supports Industry Standard Protocols
- Customization available on request
- Secure access to data & Configuration
- Multiple Language Support

SERIAL PORT (R485)

- Data Input/
  output Integration
- Modbus Protocol
- DNP3.0 Protocol
- IEC60870-104 Protocol

RELAY OUTPUTS

- 08 x Form C Relay contacts
- NO-C-NC
- Cooling control
- Alerts / Alarms

USB PORT

- Configuration & Troubleshooting
- Data Export
- MicroSD Card

POWER INPUT

- 24 / 48 Vdc
- Power Supply Unit /
  Adaptor provided as
  Accessories
  (OPTIONAL)

LED INDICATORS

- Power ON/OFF
- System Fault
- Alarm & Log

LOCAL DISPLAY

- Industrial Grade LED
- Current Values of all Parameters

ANALOG OUTPUTS

- 04 x User Programmable
- Current Output (4-20mA)
- Voltage Output (0-5V/0-10V)

ANALOG / DIGITAL INPUTS

- 08 x Configurable Inputs
- RTD (PT-100), Potentiometer
- AC Current (Clamp-On CT), DC current (4-20mA)
- Digital (Dry Contacts)

ETHERNET PORTS

- 02 x configurable Ports (RJ-45/SFP)
- Full Redundancy
- PRP Protocol
- Modbus, DNP3.0, IEC60870-104 and IEC 61850

FIBER OPTIC CHANNELS

- Up to 24 FO Temperature Inputs
- GaAs based technology
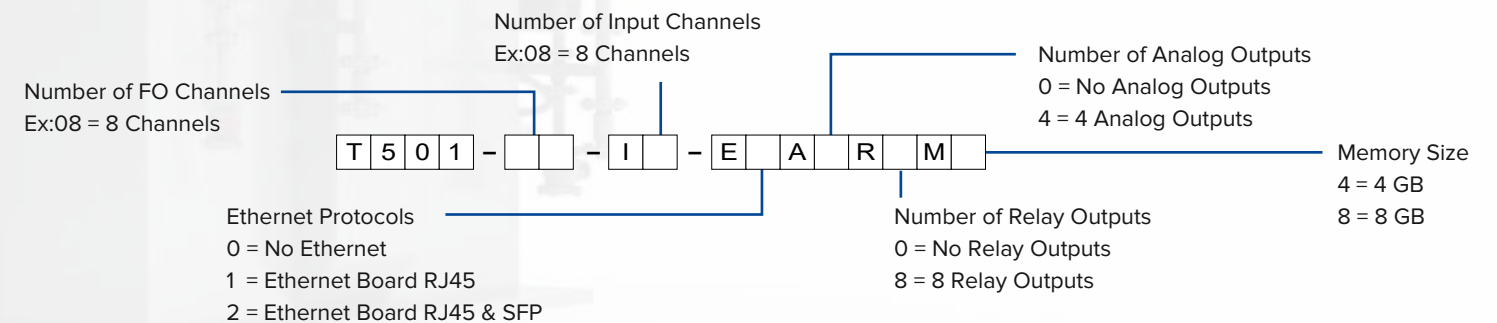- Built-In Self Test feature
- Higher Signal Strength

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MONITORING

POWER SUPPLY	Input Power Requirement	24/48 VDC ± 10%
	Power Consumption	20 Watts
ANALOG/DIGITAL INPUT MODULE	# of Input Channels	08/04 Channels
	Input Channel Types	Configurable from a range of input options, RTD, AC/DC current, Potentiometer, Dry contact switch
	Accuracy of Channels	±0.5% full scale input range
	Input Channel Sample Rate	1 Hz
FIBER OPTIC MODULES	Measurement Range	-80 °C to +300 °C (cryogenic 4 °K range optional)
	Resolution	0.1 °C
	Accuracy	±1.0 °C (±0.2 °C in relative temperature)
	Scan Rate	200 ms / channel (Optional: Faster scanning rates available)
	Number of Channels	2 to 24 channels
ANALOG OUTPUT MODULE	# of Output Channels	04 Channels
	Output format	4-20 mA or 0-5Vdc / 0-10Vdc (Configurable for any measured / calculated value)
OUTPUT RELAY MODULE	# of Output Channels	08 Form C relays (5A)
	User Programmable	Yes, from Rugged Connect Software or webserver, if present
DATA STORAGE & CONFIGURATION	Data Storage Capacity	4 or 8 GB, Industrial Grade micro-SD, extendable to 2TB
	Logging Rate	User Configurable, 1 sec interval on USB
	System Fault Indication	1 System Fault Relay, with Local LED light
	Config port	USB (to use with Rugged connect windows software)
COMMUNICATION	Serial Communication	01 x RS-485 (RS-232 optional converter)
	Ethernet Communication	02 Ethernet Ports, configurable to RJ-45 or SFP (Gigabit Optical)
	Redundancy	Support PRP Redundancy
	Protocol Supported	Modbus, DNP3.0, IEC60870-104, IEC61850, Other protocols provided on request
EMC TYPE TESTING	Conducted & Radiated Emissions	ICES-003 (2016), CISPR32 (2015), CISPR11 (2015)
	ESD and EM Field Immunity	IEC61000-4-2, C37.90-3, IEC61000-4-3, C37.90.2
	Fast Transient & Surge Immunity	IEC61000-4-4, IEC61000-4-5, C37.90.2
	Magnetic Field Immunity	IEC61000-4-8, IEC61000-4-10
	Immunity from Conducted Disturbances	IEC61000-4-6, IEC61000-4-16
	Ripple, Dips & Damped Oscillatory	IEC61000-4-17, IEC61000-4-18, IEC61000-4-29
	Safety	IEC60255-26 and CE Certified
ENVIRONMENTAL AND MECHANICAL	Operating Temperature	-40 to 72 °C
	Operating Humidity	95% Non Condensing
	Storage Temperature	-40 to 85 °C
	Dimensions	W26.7 cm x H7.2 cm x D18.7 cm (10.5″ x 2.8″ x 7.4″)
	Weight	App. 1.5 to 2.0 Kg. (based on number of configuration)

PRODUCT DRAWINGS

237.00mm [9.33in]
175.10mm [6.89in]
4X M8X1.0 -
187.54mm [7.38in]
187.54mm [7.38in]
96.10mm [3.78in]
267.54mm [10.53in]
65.00mm [2.56in]
6.50mm [.26in]
65.00mm [2.56in]

Weight : 2 Kilograms

ORDERING CODE

Number of FO Channels
Ex:08 = 8 Channels

Number of Input Channels
Ex:08 = 8 Channels

Number of Analog Outputs
0 = No Analog Outputs
4 = 4 Analog Outputs

T 5 0 1 – ☐ ☐ – I ☐ – E ☐ A ☐ R ☐ M ☐

Ethernet Protocols
0 = No Ethernet
1 = Ethernet Board RJ45
2 = Ethernet Board RJ45 & SFP

Number of Relay Outputs
0 = No Relay Outputs
8 = 8 Relay Outputs

Memory Size
4 = 4 GB
8 = 8 GB

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Certification

- ISO9001
- ISO14000
- ISO 45001 (OHSAS 18000)
- ISO17025 Certification
- NIST Certification
- ATEX Certification

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Rugged Monitoring Services

Rugged Monitoring provides customization of sensors, monitors & software. In addition we offer on-site commissioning services, maintenance contracts and technical support to all customers worldwide.

About Rugged Monitoring

Industry leading team of fiber optic experts with 100+ years of combined experience committed to delivering customizable solutions for challenging applications. We offer a range of reliable, high performance, customizable sensors and monitoring solutions that are immune to external influence.

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