SKF Multilog On-line System WVT

CMWA 7910

Cost effective, reliable and secure wireless condition monitoring for semi-critical and balance-of-plant machinery

Introduction

The SKF Multilog On-line System WVT is an advanced field mounted monitoring device that uses the Honeywell OneWireless Network. Machine condition data is uploaded to the Honeywell Experion Process Knowledge System (PKS) for trending and viewing on operator screens. Conformance with the ISA100.11a wireless standard provides reliable and encrypted data transmission.

Ideally suited for:

- Hazardous and non-hazardous areas
- Supplementing walk-around routes
- Machines that:
  - Traverse / move
  - Are distressed and require analysis

One SKF Multilog WVT typically covers the monitoring requirements of a single machine train, providing vibration and temperature data from both the driver and the driven machine. The data includes information associated with machine installation and foundation, rotor systems, and bearings as well as process related issues that can impact machinery performance or lead to reduced service life.

Key features

- Long battery life – up to 5 years, or external DC powered
- Over 40 static and dynamic measurements available per device, including acceleration, velocity, SKF Acceleration Enveloping (bearing condition), temperature and speed
- LCD display shows latest overall measurements, next trend and trace sample time, radio strength, battery status
- Detailed data analysis available with SKF @ptitude Analyst software
- Utilizes mesh networking technology

Built by two industry leaders, SKF and Honeywell, the SKF Multilog WVT is cost efficient technology designed to support increased machine uptime, reduced maintenance and improved safety. The seamless integration into your existing OneWireless infrastructure accelerates implementation and helps to reduce costs.

System components

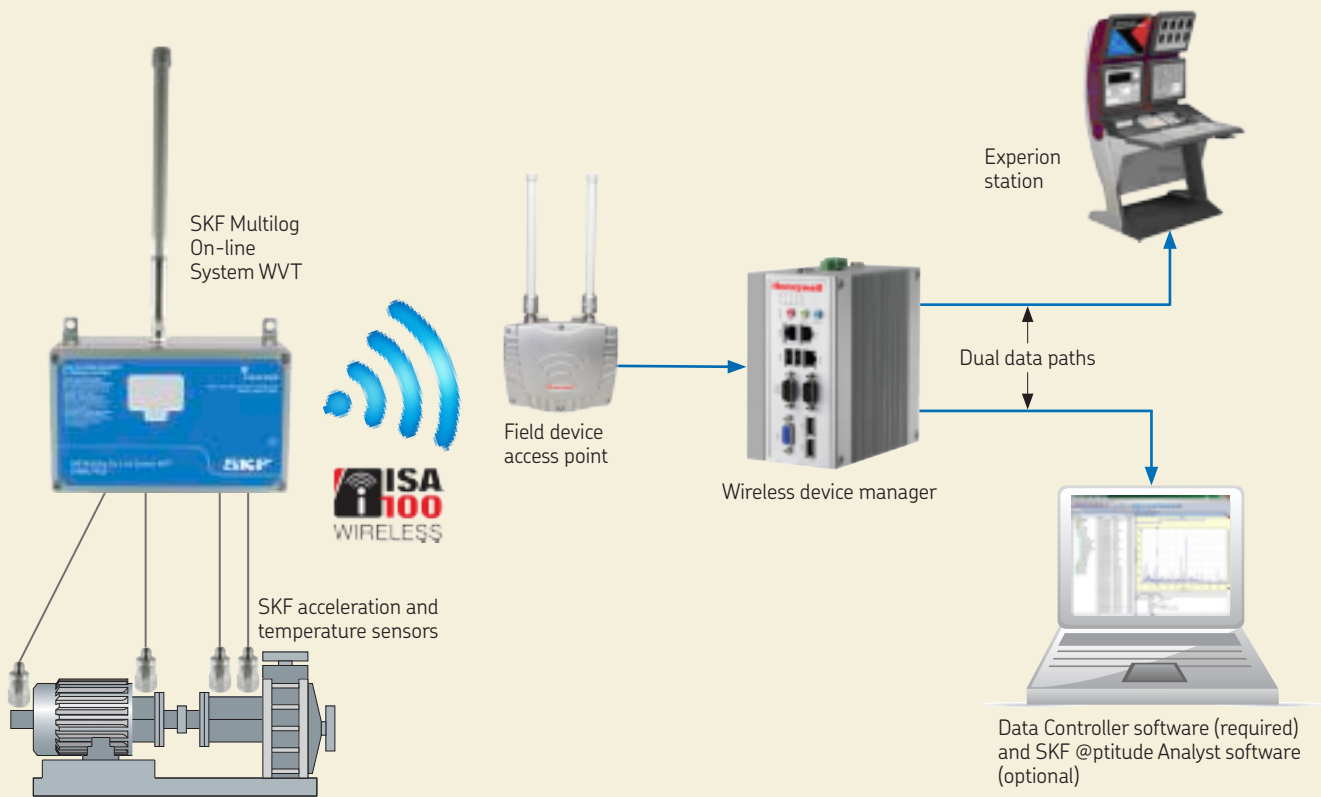## SKF and Honeywell components that make up a monitoring system:

- SKF Multilog On-line System WVT
- SKF Sensors and cables
- Data Controller software
- SKF @ptitude Analyst software for additional data analysis (optional)
- Honeywell Field Device Access Point (FDAP)*
- Honeywell Wireless Device Manager (WDM)*
- Honeywell Experion Process Knowledge System (PKS)*

* Purchase separately from Honeywell

How does it work?

The SKF Multilog WVT sends machine condition data to the Honeywell Field Device Access Point (FDAP), which transfers the data to the Honeywell Wireless Device Manager. The Wireless Device Manager hosts the gateway, system manager and security manager components. From there, the data is sent to the Experion Process Knowledge System as well as SKF @ptitude Analyst software.


System components: hardware and basic network

SKF Multilog On-line System WVT

ISA 100 WIRELESS

Field device access point

Wireless device manager

SKF acceleration and temperature sensors

Experion station

Dual data paths

Data Controller software (required) and SKF @ptitude Analyst software (optional)

SKF

Dual data paths

The SKF Multilog WVT machinery condition data is automatically uploaded to the Honeywell Experion Process Knowledge System. This same data also forms part of a more comprehensive data set that can be transmitted to the SKF @ptitude Analyst software. Data can also be exported using MODBUS and OPC.

- SKF @ptitude Analyst software offers a completely integrated approach to condition monitoring by accepting data from the full range of SKF data collection devices. Detailed information is efficiently organized so automated reports can deliver the level of information you specify.
- Honeywell's Experion Process Knowledge System is used in industrial plants and mills to integrate, control and monitor complex processes in many types of industrial settings.
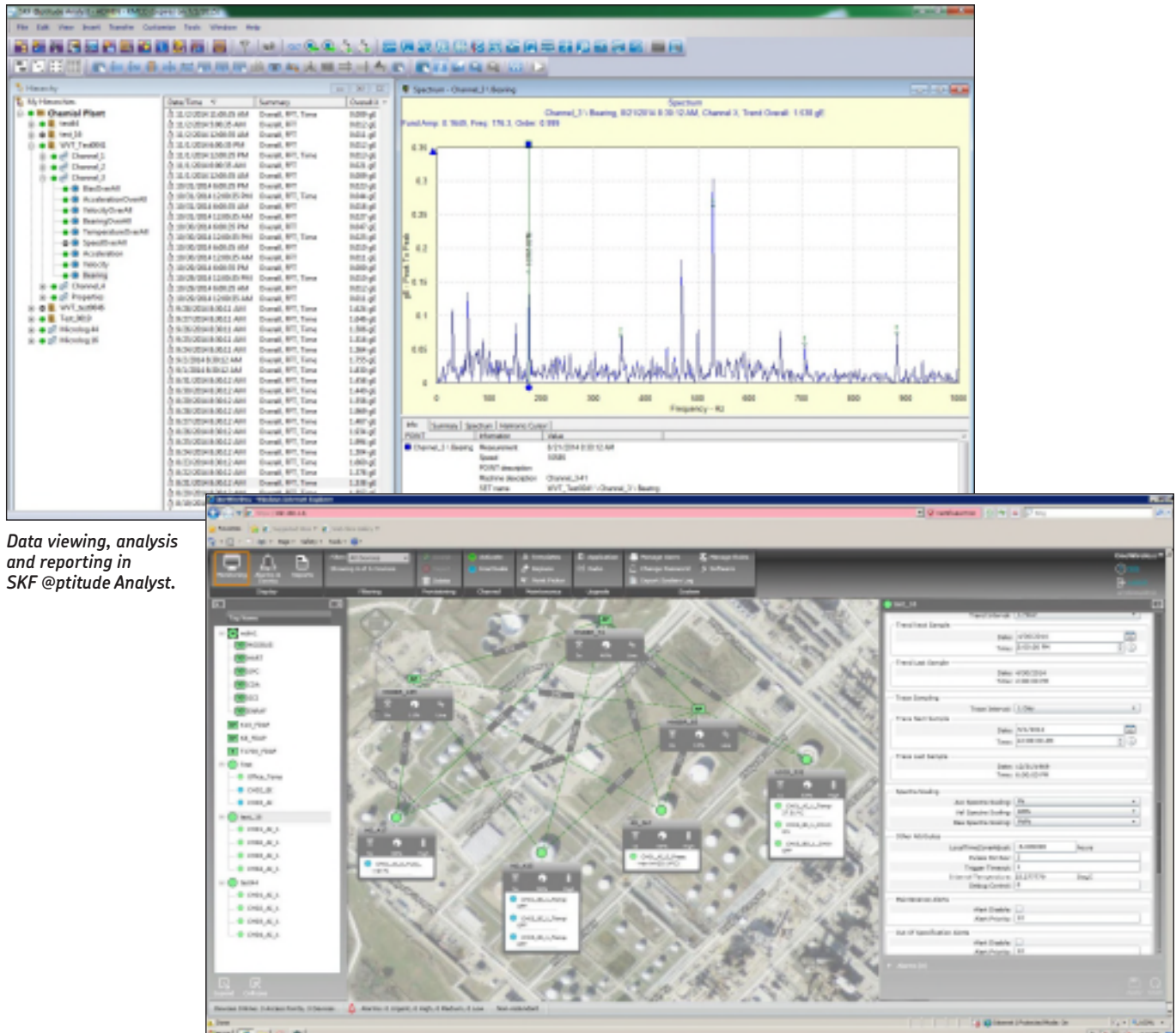
Data viewing, analysis and reporting in SKF @ptitude Analyst.

Honeywell's Wireless Device Manager (WDM) software.

Specifications

SKF Multilog On-line System WVT

Measurement

Dual input channels (1 to 4)

- Number of channels: 4 x dual input, vibration and temperature
- Sensor type: Accelerometer, special low power (<300 µW per channel)
- Coupling: DC
- Accelerometer power: 3,3 V DC
- Input voltage range: ±1,25 V around 1,5 V bias
- Nominal sensitivity: 50 mV/g
- Amplitude range: ±25 g
- Measurements: Acceleration, enveloped acceleration, velocity (by software integration)
- Gain ranges: 2 gain steps of 1 and 10 with clip detect
- Amplitude accuracy: ±2% typical in pass-band
- Dynamic range: > 70 dB
- Bias voltage check: Programmable interval

Temperature input

- Input voltage range: 0,25 to 2,75 V
- Sensitivity: −10,9 mV/°C (−6.06 mV/°F)
- Temperature measurement range: −40 to +120 °C (−40 to +248 °F)
- Accuracy: ±2,5 °C (±4.5 °F) typical

Processing

- Bandwidth ranges: (0,5 to 100 Hz) to (0,5 Hz to 20 kHz) (Fmax in 1, 2, 5 steps)
- Data block lengths: 256 to 8 192
- Spectral lines: 100 to 3 200
- Integration: One level in software
- Bearing demodulation: Hardware demodulator, fixed bandpass 500 Hz to 10 kHz (SKF Acceleration Enveloping filter 3)

- Averages: 1 to 4, 50% overlap, spectral domain only
- Non-volatile RAM: 512 kB
- Internal real-time clock

Tachometer

- Number of channels: One digital isolated or NAMUR
- Digital isolated trigger levels: Logic lo <0,7 V, logic hi 4,5 to 24,0 V
- NAMUR type: Two-wire low power
- Maximum frequency: 10 kHz

Interfaces

- Visual display: 21 character x 7 line LCD display, backlit with auto-shutdown
- Local pushbutton: Allows local interrogation of measurements, radio status, network, battery status
- Configuration interface: Infrared (ISA100.11a provisioning interface)

Communications

- Network: 802.15.4, ISA100.11a compatible
- Cable: USB port for diagnostics
- Programming: Firmware upgrades over radio network or USB

Radio

- Network: 2,4 GHz, IEEE 802.15.4
- Firmware upgrade: Over-the-Air-Provisioning (OTAP)
- Encryption: 128 bit AES
- Power / range
  - FCC/IC (USA) Radio +11 dBm, antenna 5 dBi/range 300 meters (984 feet)
  - ETSI (Europe) Radio +4 dBm, antenna 5 dBi/range 100 meters (328 feet)

Mechanical

- Enclosure: Cast aluminum, painted
- Dimensions: 26 × 16 × 9 cm (10.2 × 6.3 × 3.5 in.)
- Weight: 2,8 kg (6.2 lbs.)
- Cable entries: 6 glands
- Cable diameter: 3,0 to 6,5 mm (0.12 to 0.26 in.)

Environmental

- Operating temperature: −30 to +75 °C (−20 to +167 °F)
- Sealing: IP 66
- Compliance: CE, RoHS
- Hazardous locations:
  - CSA Class 1, Division 2, Groups A, B, C, D
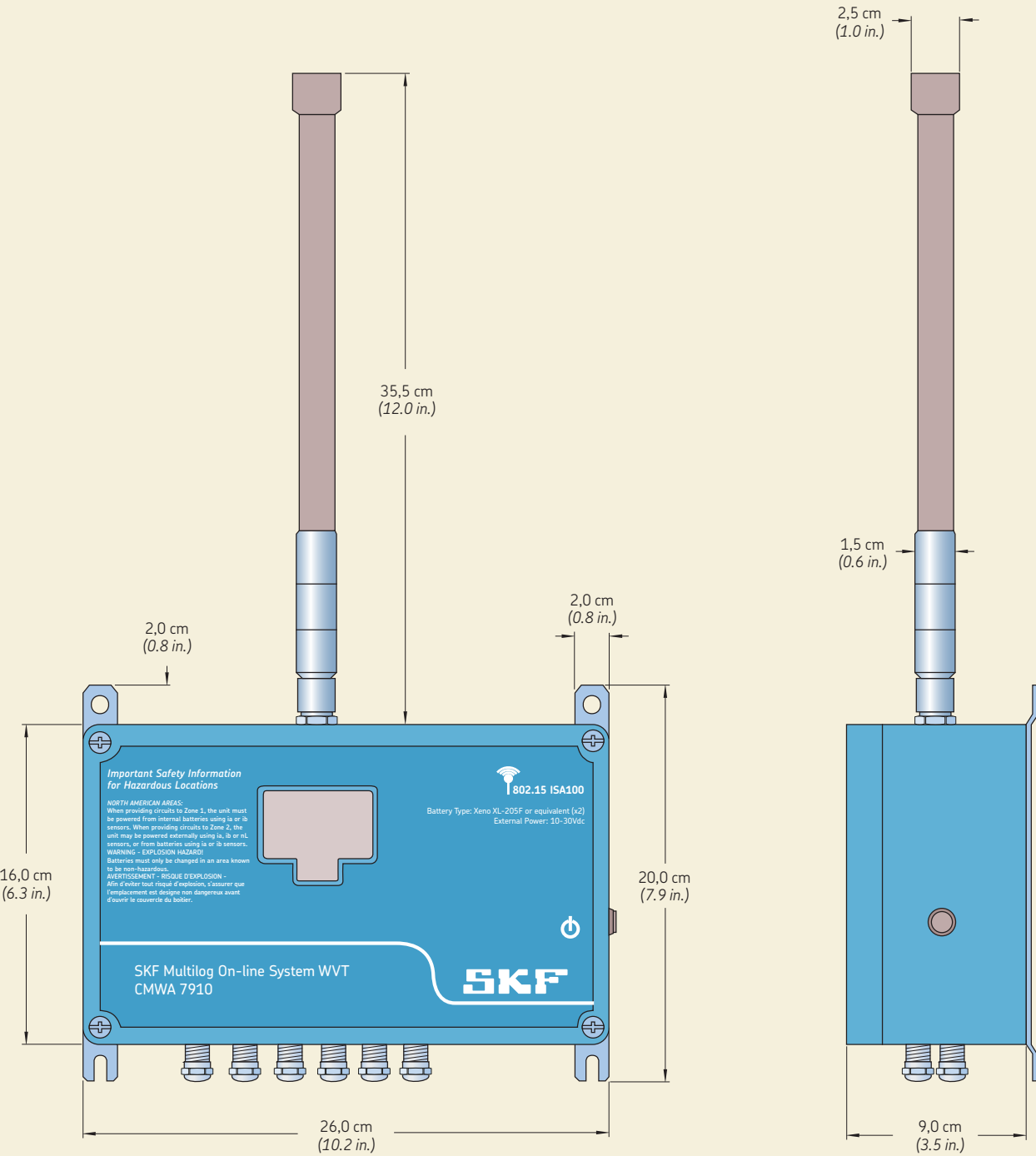 - ⟨Ex⟩ ATEX (certification pending)

Power

- Input power: Battery or DC power (10 to 30 V DC)
- Battery type: 2 x lithium 3,6 V, D cell, type Xeno XL-205F
- Battery monitor: Internal battery monitor and critical battery shutdown
- Isolation: 1 500 V from DC power input
- Battery life: Up to 5 years with default measurement configuration (refer to **Table 1**)

  - **NOTE 1:** Battery life is dependent on multiple operating parameters including, measurement settings, usage and ambient temperature.
  - **NOTE 2:** Continuous operation at the extreme ends of the ambient operating temperature range, high and low, will significantly shorten battery life.
  - **NOTE 3:** Configuring a device for routing mode requires connection to a permanent power source.

Battery life (example configurations using all four channels)			Table 1
Battery life expectancy	**Monthly**	**Daily**	**Hourly**
Up to 5 years	• Time waveform	• Velocity spectrum • Acceleration Enveloping (gE) spectrum • Bias voltage check	• Overall velocity • Overall Acceleration Enveloping (gE) • Temperature • Speed (with recommended Tachometer)

SKF

SKF Multilog WVT Dimensions

35,5 cm
(12.0 in.)

2,5 cm
(1.0 in.)

1,5 cm
(0.6 in.)

2,0 cm
(0.8 in.)

2,0 cm
(0.8 in.)

16,0 cm
(6.3 in.)

20,0 cm
(7.9 in.)

Important Safety Information for Hazardous Locations

NORTH AMERICAN AREAS:
When providing circuits to Zone 1, the unit must be powered from internal batteries using ia or ib sensors. When providing circuits to Zone 2, the unit may be powered externally using ia, ib or nL sensors, or from batteries using ia or ib sensors. WARNING – EXPLOSION HAZARD! Batteries must only be changed in an area known to be non-hazardous.
AVERTISSEMENT – RISQUE D'EXPLOSION – Afin d'éviter tout risque d'explosion, s'assurer que l'emplacement est désigne non dangereux avant d'ouvrir le couvercle du boitier.

802.15 ISA100

Battery Type: Xeno XL-205F or equivalent (x2)
External Power: 10-30Vdc

SKF Multilog On-line System WVT
CMWA 7910

SKF

26,0 cm
(10.2 in.)

9,0 cm
(3.5 in.)

CMSS 2350T-D2

Agency approved low powered industrial sensor, acceleration and temperature, straight exit

The CMSS 2350T-D2 is a low powered, dual output sensor designed for use with the SKF Multilog WVT, CMWA 7910 device. Together, the system forms a solution for permanent wireless vibra-tion monitoring.

   Common applications include rotating machinery such as pumps, motors and fans.

Features

- For use with the SKF Multilog WVT, CMWA 7910 device
- M12 connector
- Rugged, corrosion resistant and hermetically sealed
- Case isolated
- Low power
- Non-incendive

Specifications

Dynamic

- Sensitivity, 25 °C (*77 °F*): 50 mV/g
- Sensitivity precision: ±5%
- Acceleration range: 25 g peak
- Amplitude non-linearity: 1%
- Frequency range, ±3 dB: 0,3 to 15 000 Hz
- Resonance frequency, nominal: 30 kHz
- Transverse sensitivity: ≤ 5% of axial
- Temperature response: ±10% sensitivity, −25 to +120 °C (*−15 to +248 °F*)
- Temperature sensitivity: −10,9 mV/°C (*−6.06 mV/°F*)

Electrical

- Power requirements:
  - Voltage source: 3 to 5,5 V
  - Current consumption: < 100 µA
- Electrical noise, equivalent g:
  - Broadband:
    · 2,5 Hz to 25 kHz: 660 µg
  - Spectral:
    · 10 Hz: 60 µg/√Hz maximum
    · 100 Hz: 16 µg/√Hz maximum
    · 1 000 Hz: 5 µg/√Hz maximum
- Output impedance: < 1 000 Ω
- Bias output voltage (BOV): 1,5 V, ±5%
- Bias output voltage stability, including temperature effects: 1,5 V DC, ±5%
- Grounding: Case isolated, internally shielded

Typical temperature response
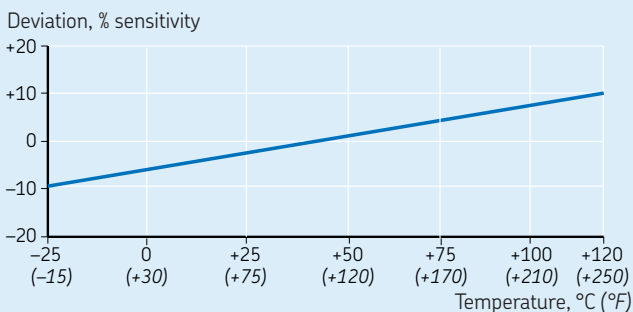
Typical frequency response

SKF
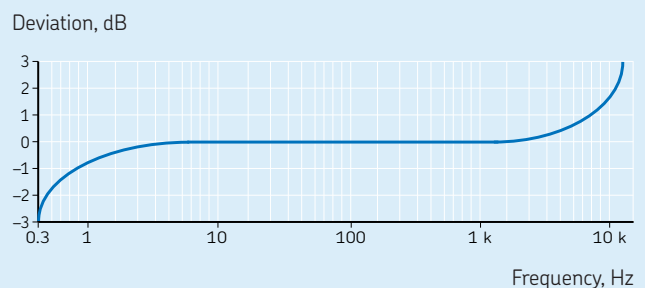
Environmental

- Temperature range: –40 to +120 °C (*–40 to +250 °F*) operating temperature
- Vibration limit: 500 g peak
- Shock limit: 5 000 g peak
- Sealing: Hermetic
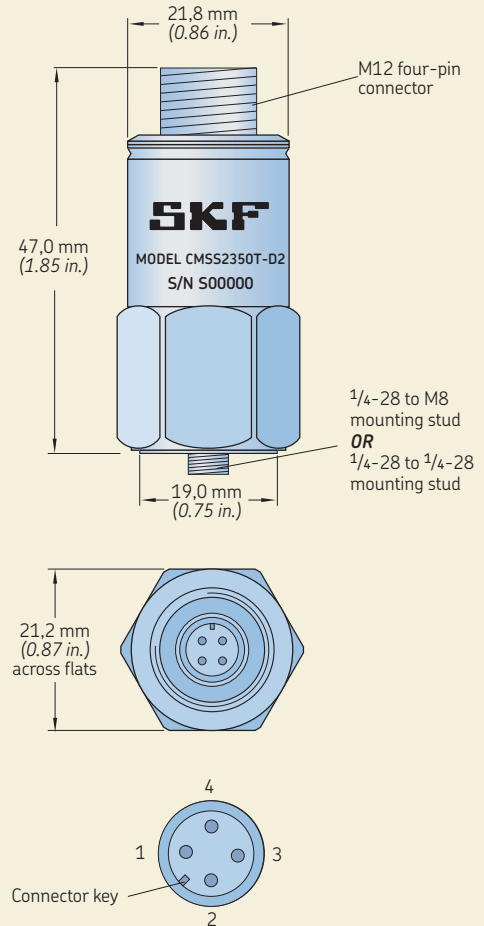- Base strain sensitivity, maximum: 200 µg/µstrain

Physical

- Dimensions: See drawing
- Weight: 90 g (*3.2 oz.*)
- Case material: 316L stainless steel
- Mounting:
  - Internal ¹/₄-28 thread
  - ¹/₄-28 to ¹/₄-28 mounting stud and ¹/₄-28 to M8 mounting adapter provided
- Mounting torque: 2,9 Nm (*24 in. lbs.*)
- Connections: 4-pin M8 connector
  - Pin 1: Power (red)
  - Pin 2: Common (black)
  - Pin 3: Signal, acceleration (1,5 V BOV) (white)
  - Pin 4: Signal, temperature (green)
- Mating connector: M12 style, 4-pin

Agency approvals

- ⟨Ex⟩ ATEX Zone 2, 3 G, Ex nA nC IIC T5 Gc, Ta = –50 °C to +85 °C.
- CSA
  - Class I, Division 2, Groups A, B, C, D
  - Class II, Division 2, Groups E, F, G
  - Class III, T5 Ex nL IIC; T5
- CE approved

CMSS 2350T-D2 Dimensions

21,8 mm (*0.86 in.*)
M12 four-pin connector
47,0 mm (*1.85 in.*)
SKF
MODEL CMSS2350T-D2
S/N S00000
¹/₄-28 to M8 mounting stud
OR
¹/₄-28 to ¹/₄-28 mounting stud
19,0 mm (*0.75 in.*)

21,2 mm (*0.87 in.*) across flats

4
1   3
Connector key
2

CMAC 2350-CABLE-xx

Agency approved cable assembly for the CMSS 2350T-D2 sensor

Cable assembly

- Connector: Five (5) socket M12 connector
- Ingress protection rating: IP 67
- Strain relief material: Fluoroelastomer terpolymer
- Cable: Four (4) conductor cable
- Cable Jacket: FEP (Fluorinated ethylene propylene)
- Color: Grey
- Shielded: Single shield
- Dimensions (diameter): 4.88 mm (*0.188 in.*)
- Compliant: RoHS compliant
- Operating temperature range: –60 to +200 °C (*–76 to +392 °F*)

Connector view

3
5
2   4
Keyway
1
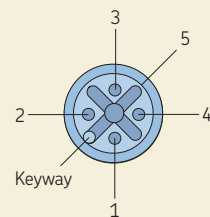
	Function	Cable
1	Power	Red
2	Common	Black
3	Acceleration signal out	White
4	Temperature signal out	Green
5	Connector shell	N/C

CMCP WVT-PWR-SUP

Agency approved power supply for up to four SKF Multilog WVT – CMWA 7910
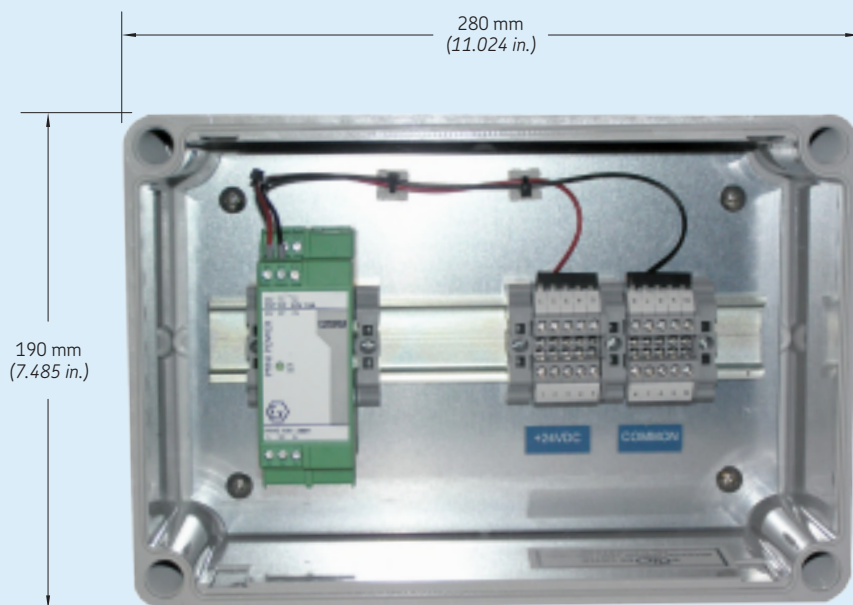
Enclosure Material

- Non-metallic enclosure
- Solid body and cover
  - PBT/PC blended plastic
  - UL94-5VA flammability rating
  - UV stabilized

Enclosure ratings

- UL508 Type 1, 2, 4, 4X, 12 and 13
- NEMA Type 1, 2, 4, 4X, 12 and 13
- IEC529-IP65

Dimensions

280 mm (11.024 in.)

130 mm (5.111 in.)

190 mm (7.485 in.)

+24VDC   COMMON

SKF

Specifications

Input

- Nominal input voltage range: 100 to 240 V AC
- Input voltage range: 85 to 264 V AC
- AC frequency range: 45 to 65 Hz
- Current consumption: 0.75 A (120 V AC) / 0.45 A (230 V AC)
- In-rush surge current: <15 A (typical)
- Power failure bypass: >35 ms (120 VA C), >150 ms (230 V AC)
- Input fuse: 3.15 A (slow-blow, internal)
- Nominal output voltage: 24 V DC ±1%

Output

- Output voltage: 24 V DC
- Output current:
  - 1.5 A (–25 to +60 °C) / 2 A (–25 to +40 °C)
  - 1.5 A (–13 to +140 °F) / 2 A (–13 to +104 °F)
- Derating: 60 to 70 °C *(140 °F to 158 °F)*, 2.5%/K
- Connection in parallel: yes, for redundancy and increased capacity
- Connection in series: yes
- Residual ripple: >40 mVPP (with nominal values)
- Peak switching voltages, nominal load: <20 mVPP (20 MHz)
- Maximum power dissipation, no-load: 1.5 W
- Power loss, nominal load: Maximum 6.5 W

Hazardous area approvals

- ⟨Ex⟩ ATEX II 3 G Ex nA nC IIC T4 Gc X
- CSA/UL: 22.2 Class I Division 2
- Other: UL/C-UL Listed UL 508

Temperature ratings

- Ambient temperature (operation):
  - –25 to +70 °C <> 60 °C (derating)
  - –13 to +158 °F <> 140 °F (derating)
- Ambient temperature (storage / transport): –40 to +85 °C *(–40 to +185 °F)*
- Maximum permissible relative humidity (operation): 100% (condensation permitted)

Ordering information

Bundles

Starter kit - North American telecom standard

- **CMWA 7910-SK-5M-FCC/IC***
  - One (1) each, **CMWA 7910-FCC/IC,** SKF Multilog WVT
  - Four (4) each, **CMSS 2350T-D2,** low power industrial sensors
  - Four (4) each, **CMAC 2350-CABLE-5M,** 5 m *(16.4 ft.)* cable assemblies
  - **CMSW 7915,** Data Controller software
  - Product reference CD, with user manual
- **CMWA 7910-SK-10M-FCC/IC***
  - One (1) each, **CMWA 7910-FCC/IC,** SKF Multilog WVT
  - Four (4) each, **CMSS 2350T-D2,** low power industrial sensors
  - Four (4) each, **CMAC 2350-CABLE-10M,** 10 m *(32.8 ft.)* cable assemblies
  - **CMSW 7915,** Data Controller software
  - Product reference CD, with user manual

Starter kit - European telecom standard

- **CMWA 7910-SK-5M-ETSI***
  - One (1) each, **CMWA 7910-ETSI,** SKF Multilog WVT
  - Four (4) each, **CMSS 2350T-D2** low power industrial sensors
  - Four (4) each, **CMAC 2350-CABLE-5M**, 5 m *(16.4 ft.)* cable assemblis
  - **CMSW 7915,** Data Controller software
  - Product reference CD, with user manual
- **CMWA 7910-SK-10M-ETSI***
  - One (1) each, **CMWA 7910-ETSI,** SKF Multilog WVT
  - Four (4) each, **CMSS 2350T-D2** low power industrial sensors
  - Four (4) each, **CMAC 2350-CABLE-10M**, 10 m *(32.8 ft.)* cable assemblis
  - **CMSW 7915,** Data Controller software
  - Product reference CD, with user manual

* Battery not included in the SKF Multilog WVT and should be ordered separately as shown to the right or sourced locally.

Accessories and additional components

SKF Multilog WVT – North American telecom standard*

- **CMWA 7910-FCC/IC,** SKF Multilog WVT

SKF Multilog WVT – European telecom standard*

- **CMWA 7910-ETSI,** SKF Multilog WVT

Battery

- **CMAC 7910-BAT-02,** battery (set of 2), lithium 3.6 V, D cell, type Xeno XL-205F

WARNING: The cover on the enclosure can be removed for batteries changing or other servicing only in an area known to be non-hazardous.

Battery holder

- **CMAC 7910-BH,** battery holder, includes battery cradle mounted on PC board with integral connector

Power supply

- **CMCP WVT-PWR-SUP,** power supply in fiberglass enclosure, IP 66, CUL-EX Cl1/Division 2 Groups A, B, C, D

Vibration / temperature sensor

- **CMSS 2350T-D2,** low power industrial sensor

Cable assemblies for vibration / temperature sensor

- **CMAC 2350-CABLE-5M,** 5 m *(16.4 ft.)* cable with M12 4-pin, connector
- **CMAC 2350-CABLE-10M,** 10 m *(32.8 ft.)* cable with M12 4-pin, connector
- **CMAC 2350-CABLE-20M,** 20 m *(65.6 ft.)* cable with M12 4-pin, connector

Software

- **CMSW 7915,** Data Controller software**
- **CMSW 7400-SC-SL,** SKF @ptitude Analyst Software, single client

** Data Controller software
- Communicates with a maximum of eight wireless device managers.
- Communicates with a maximum of 240 SKF Multilog WVT devices (up to 30 SKF Multilog WVT devices per Wireless device manager).
- Configures SKF Multilog WVT devices from default factory state to user-provided configuration data.
- Collects time wave, spectrum data, and trend values (or process value, PV) from all four channels of SKF Multilog WVT devices at user-configured periods for these possible measurements: acceleration, velocity and bearing, speed, bias voltage and temperature.
- Provides the collected time wave, spectrum data and trend values to SKF @ptitude Analyst software for additional data analysis.

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Accessories and additional components (continued)

Remote antenna installation accessories

- **CMAC 7820-ANT,** Antenna (Spare)
- **CMAC 7820-MK,** Remote antenna mounting kit
- **CMAC 7820-EXTCBL-1M,** 1 m *(3.3 ft.)* cable for remote antenna
- **CMAC 7820-EXTCBL-3M,** 3 m *(9.8 ft.)* cable for remote antenna
- **CMAC 7820-EXTCBL-10M,** 10 m *(32.8 ft.)* cable for remote antenna

NOTE: One (1) CMAC 7820-ANT is supplied with each SKF Multilog WVT. For remote antenna installation choose one (1) cable assembly from the above list and one (1) mounting kit.

Tachometer and tachometer cable assemblies

- **CMAC 7911,** agency approved tachometer sensor, NAMUR standard, 8 mm tip diameter, M8 thread
- **CMAC 7911-CABLE-5M,** 5 m *(16.4 ft.)* cable with M12 4-pin, connector
- **CMAC 7911-CABLE-10M,** 10 m *(32.8 ft.)* cable with M12 4-pin, connector
- **CMAC 7911-CABLE-25M,** 25 m *(82.0 ft.)* cable with M12 4-pin, connector

Support services

SKF offers a wide range of on-site technical services including:
- System installation services – commissioning, testing, reporting
- Sensor mounting, installation or verification
- Vibration analysis by SKF Reliability experts
- Product and technology specific training through SKF Reliability Maintenance Institute
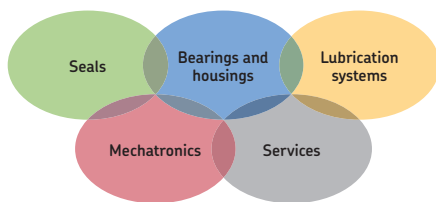
The Power of Knowledge Engineering
Combining products, people, and application-specific knowledge, SKF delivers innovative solutions to equipment manufacturers and production facilities in every major industry worldwide. Having expertise in multiple competence areas supports SKF Life Cycle Management, a proven approach to improving equipment reliability, optimizing operational and energy efficiency and reducing total cost of ownership.

These competence areas include bearings and units, seals, lubrication systems, mechatronics, and a wide range of services, from 3-D computer modelling to cloud-based condition monitoring and asset management services.

SKF's global footprint provides SKF customers with uniform quality standards and worldwide product availability. Our local presence provides direct access to the experience, knowledge and ingenuity of SKF people.

Please contact:

SKF USA Inc.
Condition Monitoring Center – San Diego
5271 Viewridge Court · San Diego, California 92123 USA
Tel: +1 858-496-3400 · Fax: +1 858 496-3531
Web: www.skf.com/cm

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