



for a greener tomorrow

# SMART CONDITION MONITORING

for Predictive Maintenance



- Reliable online machine monitoring
- Easy startup with Plug&Play
- Flexible and expandable system
- Ideal for monitoring motors, gearboxes, pumps and fans

# Smart Condition Monitoring

Manufacturers need to respond to global competition and sourcing. Therefore, there is a need to look for solutions based on reducing cost, eliminating risks, improving system design and helping to manage maintenance to maximize reliable production. Condition monitoring offers a predictive approach to plant maintenance ensuring optimum asset performance, whilst keeping downtime to a minimum.



## Holistic Approach

To optimize maintenance activities it is crucial to have up to date visibility of the status of machinery including primary assets and services such as motors, fans, pumps, compressors and gearboxes.

Mitsubishi Electric offers this capability through its integrated solutions collecting live data from advanced measurement sensors for analysis by multiple levels of management systems enables a holistic approach.

## Standard Monitoring

Increases in operating temperature, excessive current draw, changes in vibration characteristics and significant shifts in other operating parameters can all be indicative of impending problems in rotating machines.

## Advanced Monitoring

Condition monitoring based on vibration analysis was once the province of experts work, but the introduction of SCM with smart sensors revolutionised condition monitoring.

The SCM solution monitors online the full range of parameters and complements 'traffic light' alerts with detailed diagnostics after a status change and vibration patterns out of the norm in the application and offers for non-experts in-depth analysis and recommendations for actions to minimize unscheduled downtime and maximize asset availability. The maintenance can be scheduled in advance for key assets more effectively and generate significant reductions in losses, optimizing asset lifecycle management.

## PLUG & PLAY solution SMC KIT

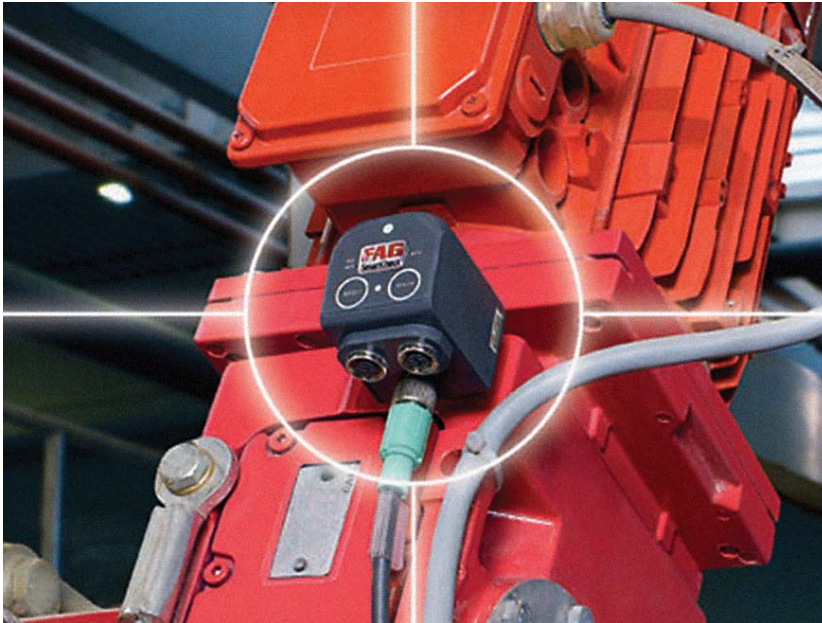
Mitsubishi Electric has built on the Smart Condition Monitoring a solution named SCM Kit using the advanced FAG SmartCheck sensors for monitoring.

The SCM Kit is a pre-configured plug-and-play solution delivered with multi-language touch operator interface and one vibration sensor.

The bi-directional data flow from multiple sensors is transferred over Ethernet to the integrated smart sensor controller for in-depth monitoring and more detailed analysis and information. This information can be redirected to higher level systems via network or telemetric remote services. Adaption of local external parameters is supported and can be linked via the sensor controller to the sensors for more precise analysis, like speed information from a motor.

Up to six sensors can be added to machines via the touch interface intuitively. With a simple teach function allowing the sensor and controller to learn the normal operating state of the machine.

Once set up, the SCM Kit provides 24/7 online monitoring of each asset and real-time alarms give the operator information about the type of condition. The clear text information includes advice for service and maintenance staff and the integrated statistical information indicate a developing problem on an individual machine and support a optimization of better maintenance and reduce the life-cycle cost.



Easy mounting of the SmartCheck sensor unit with a screw on top of the motor or gear box and connecting with a single cable due to Power over Ethernet (PoE) technology

### Operating Benefits

The SCM analysis provides detailed diagnostics and more precise error identification with identifying the root cause and even recommendations as to what rectification actions should be taken.

- **Predictable maintenance**  
Plannable service month before breakdown
- **Reliable online monitoring**  
Patented sensor diagnosis
- **Intelligent process monitoring**  
Recording parameters in correlation with vibration signals
- **Easy and intuitiv startup**  
Plug&Play solution pre-configured
- **Intuitive operation**  
Automatic adjustment of alarm thresholds
- **Long term storage of historical data**  
Root cause analysis
- **Flexible, expandable system**  
Stand-alone or network system for new or existing applications
- **Full service around machine diagnosis**  
Supporting remote and cloud services

### Functionalities

Mitsubishi Electric's Smart Condition Monitoring system supports a number of functions that aid in predictive maintenance

- Bearing defect detection
- Imbalance detection
- Misalignment detection
- Lack of lubricant detection
- Temperature measurement
- Cavitation detection
- Phase failure recognition
- Resonance frequency detection
- Trend of damage development
- Clear text status messages

### Target Applications

The Smart Condition Monitoring system overcomes the limitations of traditional sensors. The Smart Condition Monitoring system provides an improved solution for all rotating application with bearings:

- Electric and geared motors
- Fluid and vacuum pumps
- Ventilators and fans
- Gearboxes
- Compressors

### Application examples



#### Waste Water Plant

Three Archimedes-Screw pumps with gear box, redundant, SCM Kit and three sensor, analog speed values, telemetric access and access point for SCADA. Break down of the gear box in a time frame of 1–3 years.

##### Detected failure

Four months after installation gear wheel defect detected

##### Costs

Overhaul of gear box: €1,000  
New gear box: €5,500  
Saving €4,500

##### SCM solution cost:

Hardware: €4,700  
Installation: €1,000

Installation by Mitsubishi Electric partner



#### Sugar Plant

Four gear boxes at a sugar beetwashing machine, SCM Kit-1 COMPACT with four sensors. Buffer time during stop is 10 minutes.

##### Costs

6 hour unplanned stoppage à €60,000 during Campaign mode (€360,000)  
1.5 hour stoppage with scheduled maintenance (€90,000)  
Saving: €270,000

##### SCM solution cost:

Hardware: €5,000  
Installation: €3,000

Installation by System Integrator supported by Mitsubishi automation partner

# The Smart Condition Monitoring Kit-1 COMPACT

Simple decision. The SCM Kit-1 COMPACT is one of our SCM solutions and offers outstanding value and reduces costly downtime. It is a completely pre-configured condition monitoring solution for new or existing applications with one vibration sensor and is optionally expandable with up to six sensors.



SCM Kit-1 COMPACT	PART NO.
<b>Compact control cabinet H×W×D: 30×30×21 cm</b> <b>incl. SmartCheck-Kit pre-configured SmartCheck sensor #1 with 10 m Ethernet PoE connecting cable, expandable with up to six sensors.</b> <b>Mounting with M6 screw connection</b> <b>Integral programmable sensor controller for data processing and external signal handling</b> <b>Integral 4.3" operating display for visualisation and parameter adjustment</b> <b>PoE switch for data signals and sensor power supply</b>	290578
<b>OPTIONAL FOR EXPANSION:</b>	
<b>FAG SmartCheck – preconfigured Kit sensor #2</b>	298547
<b>FAG SmartCheck – preconfigured Kit sensor #3</b>	298548
<b>FAG SmartCheck – preconfigured Kit sensor #4</b>	298549
<b>FAG SmartCheck – preconfigured Kit sensor #5</b>	298550
<b>FAG SmartCheck – preconfigured Kit sensor #6</b>	298551
<b>Ethernet cable 10 m for SCM Kit sensor</b>	271188
<b>Ethernet cable 20 m for SCM Kit sensor</b>	271189
<b>Ethernet cable 30 m for SCM Kit sensor</b>	298545
<b>Ethernet cable 50 m for SCM Kit sensor</b>	297286
<b>FAG SmartCheck SPM mounting adapter M8/M6</b>	271184

## European Offices

<b>Mitsubishi Electric Europe B.V.</b> Mitsubishi-Electric-Platz 1 D-40882 Ratingen Phone: +49 (0)2102 / 486-0	<b>Germany</b>	<b>Mitsubishi Electric (Russia) LLC</b> 52, bld. 1 Kosmodamianskaya emb. RU-15054 Moscow Phone: +7 495 / 721 2070	<b>Russia</b>
<b>Mitsubishi Electric Europe B.V.</b> Radická 751/113e Avenue Business Park CZ-158 00 Praha 5 Phone: +420 251 551 470	<b>Czech Rep.</b>	<b>Mitsubishi Electric Europe B.V.</b> Carretera de Rubí 76-80 Apdo. 430 E-08190 Sant Cugat del Valles (Barcelona) Phone: +34 (0) 93 / 5653131	<b>Spain</b>
<b>Mitsubishi Electric Europe B.V.</b> 25, Boulevard des Bouvets F-92741 Nanterre Cedex Phone: +33 (0)1 / 55 68 55 68	<b>France</b>	<b>Mitsubishi Electric Europe B.V. (Scandinavia)</b> Fjellvägen 8 SE-22736 Lund Phone: +46 (0) 8 625 10 00	<b>Sweden</b>
<b>Mitsubishi Electric Europe B.V.</b> Viale Colleoni 7 Palazzo Sino I-20864 Agrate Brianza (MB) Phone: +39 039 / 66 53 1	<b>Italy</b>	<b>Mitsubishi Electric Turkey Elektrik Ürünleri A.Ş.</b> Serifali Mahallesi Nispetiye Sokak No:5 TR-34775 Ümraniye-İSTANBUL Phone: +90 (0)216 / 969 25 00	<b>Turkey</b>
<b>Mitsubishi Electric Europe B.V.</b> Westgate Business Park, Ballymount IRL-Dublin 24 Phone: +353 (0)1 4198800	<b>Ireland</b>	<b>Mitsubishi Electric Europe B.V.</b> Travelers Lane UK-Hatfield, Herts. AL10 8XB Phone: +44 (0)1707 / 28 87 80	<b>UK</b>
<b>Mitsubishi Electric Europe B.V.</b> Nijverheidsweg 23C NL-3641RP Mijdrecht Phone: +31 (0) 297 250 350	<b>Netherlands</b>	<b>Mitsubishi Electric Europe B.V.</b> Dubai Silicon Oasis United Arab Emirates - Dubai Phone: +971 4 3724716	<b>UAE</b>
<b>Mitsubishi Electric Europe B.V.</b> ul. Krakowska 50 PL-32-083 Balice Phone: +48 (0) 12 347 65 00	<b>Poland</b>		

## Representatives

<b>GEVA</b> Wiener Straße 89 A-2500 Baden Phone: +43 (0)2252 / 85 55 20	<b>Austria</b>	<b>Electrobit OÜ</b> Pärnu mnt. 163 EST-11317, Tallinn Phone: +372 6518 140	<b>Estonia</b>	<b>INTEHSIS SRL</b> bld. Itaian 23/1 MD-2060 Kishinev Phone: +373 (0)22 / 66 4242	<b>Moldova</b>	<b>CSC - AUTOMATION Ltd.</b> 4 B, Yevhenia Sverstyuka Str. UA-02802 Kiev Phone: +380 (0)44 / 494 33 44	<b>Ukraine</b>	<b>CEG LIBAN</b> Cebaco Center/Block A Autostrade DORA Lebanon-Beirut Phone: +961 (0)1 / 240 445	<b>Lebanon</b>
<b>OOO TECHNION</b> Prospect Nezavisimosti 177-9 BY-220125 Minsk Phone: +375 (0)17 / 393 1177	<b>Belarus</b>	<b>UTECO A.B.E.E.</b> 5, Marousias Str. GR-18542 Piraeus Phone: +30 (0)211 / 1206-900	<b>Greece</b>	<b>Fonsecas S.A.</b> R. João Francisco do Casal 87/89 PT-3801-997 Aveiro, Esqueira Phone: +351 (0)234 / 303 900	<b>Portugal</b>	<b>ILAN &amp; GAVISH Ltd.</b> 24 Shomkar St., Kiryat Arze IL-49001 Petah-Tikva Phone: +972 (0)3 / 922 18 24	<b>Israel</b>	<b>ADROIT TECHNOLOGIES</b> 20 Waterford Office Park 189 Wilkoppen Road ZA-Fourways Phone: +27 (0)11 / 658 8100	<b>South Africa</b>
<b>INEA RBT d.o.o.</b> Bosnia and Herzegovina Stepne 11 SI-1000 Ljubljana Phone: +386 (0)1 / 513 8116	<b>Bosnia and Herzegovina</b>	<b>MELTRADE Kft.</b> Ferdő utca 14. HU-1107 Budapest Phone: +36 (0)1 / 431-9726	<b>Hungary</b>	<b>Sirius Trading &amp; Services</b> Aleea Lacul Morii Nr. 3 RO-060841 Bucuresti, Sector 6 Phone: +40 (0)21 / 430 40 06	<b>Romania</b>	<b>GIRIT CELADON Ltd.</b> 12 Ha'amant Street IL-42505 Netanya Phone: +972 (0)9 / 863 39 80	<b>Israel</b>		
<b>AKHNATON</b> 4, Andrei Lipachev Blvd., PO Box 21 BG-1756 Sofia Phone: +359 (0)2 / 817 6000	<b>Bulgaria</b>	<b>TDO Kazpromavtomatika</b> Ul. Zhambyla 28 KAZ-100017 Karaganda Phone: +7 7212 / 50 10 00	<b>Kazakhstan</b>	<b>INEA SR d.o.o.</b> Ul. Karadjordjeva 12/217 SER-11300 Smederevo Phone: +386 (026) 461 54 01	<b>Serbia</b>	<b>SHERP MOTION TECHN. Ltd.</b> Rehov Hamerkava 19 IL-58851 Holon Phone: +972 (0)3 / 559 54 62	<b>Israel</b>		
<b>INEA CR</b> Luznička 4 a HR-10000 Zagreb Phone: +385 (0)1 / 36 940 - 01/-02/-03	<b>Croatia</b>	<b>OAK Integrator Products SIA</b> Rīgasmaija 23 LV-1058 Riga Phone: +371 67842280	<b>Latvia</b>	<b>SIMAP SK</b> Dolné Páľové 603/97 SK-911 06 Trenčín Phone: +421 (0)3743 0472	<b>Slovakia</b>				
<b>AutoCont C.S. S.R.O.</b> Kafkova 1853/3 CZ-702 00 Ostrava 2 Phone: +420 595 691 150	<b>Czech Republic</b>	<b>Automatiks Centras, UAB</b> Neries krantinė 14A-101 LT-48397 Kaunas Phone: +370 37 262707	<b>Lithuania</b>	<b>INEA RBT d.o.o.</b> Stepne 11 SI-1000 Ljubljana Phone: +386 (0)1 / 513 8116	<b>Slovenia</b>				
<b>HANS FOLSGAARD A/S</b> Theilgaardsgade 1 DK-4600 Køge Phone: +45 4320 8600	<b>Denmark</b>	<b>ALFATRADE Ltd.</b> 99, Paola Hill Malta-Paola PLA 1702 Phone: +356 (0)21 / 697 816	<b>Malta</b>	<b>OMNI RAY AG</b> Im Schöbli 5 CH-8600 Dübendorf Phone: +41 (0)44 / 802 28 80	<b>Switzerland</b>				

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## Mitsubishi Electric Europe B.V.

FA - European Business Group  
Mitsubishi-Electric-Platz 1  
D-40882 Ratingen Germany  
Tel.: +49(0)2102-4860 Fax: +49(0)2102-4861120  
info@mitsubishi-automation.com  
https://eu3a.mitsubisielectric.com

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