RTM X42
Multi-Channel Radio Transmission Tension Monitoring and Control System

RTM X42 is an innovative system that utilizes force measuring rollers to capture the tension of individual wires or strands, and then securely transmits this data from the rotating to the static part of the machine. The system is designed with fully compatible components. Its expandable features makes it ideal for applications in multi-channel planetary cage, tubular, rigid frame stranding machines or double twist bunching machines. It improves production rates and outgoing quality level of cable producing machinery. RTM X42 is designed to easily retrofit onto existing machines.
Standard System RTM X42

RTM Receiver

RTM Transmitter

Channel Extension

PC with RTM-software: Tension Monitoring System Configuration

PLC: Tension Control Safety Technology

PC with RTM-software: Tension Monitoring System Configuration
RTM X42 Sub Versions

The RTM X42 System bases on RTM X2 technology. The modular concept of RTM X42 allows an incremental expansion of the system by modules of 4 channels up to a maximum of 42 channels. It is offered in 5 different sub versions:

- **RTM X42.IO**: Standard system with possibility to connect up to 42 force sensors. 42 analogue outputs and web browser for parameter setting.
- **RTM X42.PC**: 42 force sensors. RTM-PC Software with data processing capability and visualisation of up 42 channels on PC-monitor.
- **RTM X42.PC/IO**: The same configuration as RTM X42 PC but expansion of receiver to up to 42 analogue outputs
- **RTM X42.MODBUS**: Up to 42 force sensors. Interface Modbus TCP – Profibus DP Slave via Gateway on receiver side.
- **RTM X42.MODBUS/PC**: Interface Modbus TCP – Profibus DP Slave via Gateway on receiver side. RTM-PC Software with data processing capability and visualisation of up 42 channels
RTM X42.IO System with Analogue IOs

- Expansion of the system by modules of 4 channels up to a maximum of 42 channels.
- Tension Data is transmitted wirelessly in real-time to a receiver/processing unit.
- Web browser for parameter setting
Relay Functions RTMX42.IO

The RTM X42.IO System can be configured to trigger alarms, if certain tension limits are violated or system relevant functions such as supply voltage or radio link are out of range. This is realised by means of Relay Outputs. The alarm outputs are activated if one of the active channels over or under shoots the pre-set limits. The Relay functions are described in the following table.

<table>
<thead>
<tr>
<th>Relay</th>
<th>Function EMGZ482R</th>
<th>Function EMGZ484R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relay 1</td>
<td>Tension limit CH1</td>
<td>Tension limit CH3</td>
</tr>
<tr>
<td>Relay 2</td>
<td>Tension limit CH2</td>
<td>Tension limit CH4</td>
</tr>
<tr>
<td>Relay 3</td>
<td>SW-programmable:</td>
<td>Tension limit CH5</td>
</tr>
<tr>
<td></td>
<td>- Battery status OK</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Tension limit Core</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Radio link OK</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Sum Error CH1-42</td>
<td></td>
</tr>
<tr>
<td>Relay 4</td>
<td></td>
<td>Tension limit CH6</td>
</tr>
</tbody>
</table>
RTM X42.IO System Components

EMGZ482T or EMGZ482T.24VDC

EMGZ484T

10x

4x

Cable to next EMGZ484T

Power Supply for EMGZ482T.24 VDC

Force Measuring Rollers CH1 and 2

EMGZ482R.10CH

24 VDC

RJ-45 (Web Browser)

Basic I/O (optional)

Anal. Out CH 1-2

Relay CH1-2

Anal. Out CH 3-6

Relay CH 3-6

Anal. Out CH 7-10

Relay CH 7-10
RTM X42.PC System

- Connection of 2 force sensors and up to 10x EMGZ484T Channel-Expansion Modules.
- On receiver side EMGZ482R with FMS PC-RTM-Software package
- Visualisation of 42 channels
RTM X42.PC System Components

- EMGZ482T or EMGZ482T.24VDC
- EMGZ484T
- EMGZ482R
- RJ45 Connector Cross-over-cable
- 24 VDC

Cable to next EMGZ484T
Power Supply for EMGZ482T.24 VDC
Force Measuring Rollers CH1 and 2
RTM X42.PC/IO System

- RTM X42.PC-System but with possibility to expand receiver side by 42 channels.
- The data processing software allows tension analysis of up to 42 channels.
- **Combines** the versions RTM X42.PC and RTMX42.IO in one.
RTM X42.MODBUS System

- Connection of up to 42 force sensors.
- On the receiver side data transmission via Gateway (Modbus – Profibus DP Slave).
- Tension values are output as raw data.
RTM X42.MODBUS/PC System

- Combination of the two subsystems RTM X42.PC and RTM X42.MODBUS
- On the receiver side data transmission via Gateway (Modbus – Profibus DP Slave).
- FMS PC-RTM-Software package with data analysis and visualisation of 42 channels
EMGZ482T: RTM-Transmitter

Technical Data EMGZ482T

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Channels</td>
<td>2 channels for 2 sensors</td>
</tr>
<tr>
<td>Sensor Supply</td>
<td>3.0 VDC high stability</td>
</tr>
<tr>
<td>Resolution A/D</td>
<td>8192 Digits (14 bits)</td>
</tr>
<tr>
<td>Wire Interface</td>
<td>RS485 (proprietary)</td>
</tr>
<tr>
<td>Wireless Interface</td>
<td>2.4GHz</td>
</tr>
<tr>
<td>Power Supply</td>
<td>3.7V battery Li Ion or 24 VDC (18..36 V) via slip rings</td>
</tr>
<tr>
<td>Temperature Range</td>
<td>0…50°C (32…122°F)</td>
</tr>
<tr>
<td>Protection Class</td>
<td>IP52</td>
</tr>
<tr>
<td>Elec. Connections</td>
<td>2 or 4 M16 connectors</td>
</tr>
</tbody>
</table>

Transmitter functionality:
- Wireless transmission up to 20 m
- Powered by battery or 24V DC
- Highly stable force sensor power supply
- Engineered to operate in high revolution applications.
# EMGZ482R: RTM-Receiver

## Technical Data EMGZ482R

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Channels</td>
<td>2 channels for 2 sensors</td>
</tr>
<tr>
<td>Operation panel</td>
<td>3 keys and 5-buttons wind rose</td>
</tr>
<tr>
<td>Displays</td>
<td>LCD 2x 8 characters (5mm) 1 LED rows per channel Battery load indicator</td>
</tr>
<tr>
<td>PLC Interface</td>
<td>2x analogue outputs 0…10VDC</td>
</tr>
<tr>
<td>Control Interface</td>
<td>Web browser / PC RTM software</td>
</tr>
<tr>
<td>Wire Interface</td>
<td>RS485 (proprietary)</td>
</tr>
<tr>
<td>Wireless Interface</td>
<td>2.4GHz</td>
</tr>
<tr>
<td>Resolution D/A</td>
<td>0…4096 (12 bits)</td>
</tr>
<tr>
<td>Power Supply</td>
<td>24 VDC (18..36 V)</td>
</tr>
<tr>
<td>Temperature Range</td>
<td>0…50°C (32…122°F)</td>
</tr>
<tr>
<td>Protection Class</td>
<td>IP52</td>
</tr>
</tbody>
</table>

## Receiver functionality:
- Displays tension values on a bar-graph
- **Provides 0...10V or 0/4...20mA analog outputs** to connect to PLC.
- Parameter setting via web browser
- System configuration via web browser /sophisticated PC RTM software.
EMGZ484T: Channel Extension Transmitter

**Technical Data EMGZ484T**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Analogue Inputs</td>
<td>4 additional force sensors</td>
</tr>
<tr>
<td>Wire Interface</td>
<td>RS485 bus (proprietary)</td>
</tr>
<tr>
<td></td>
<td>Connected with EMGZ482T</td>
</tr>
<tr>
<td>Resolution D/A</td>
<td>8192 Digits (14 bits)</td>
</tr>
<tr>
<td>Power Supply</td>
<td>24 VDC delivered from EMGZ482T</td>
</tr>
<tr>
<td>Temp. Range</td>
<td>0…50°C (32…122°F)</td>
</tr>
<tr>
<td>Protection Class</td>
<td>IP52</td>
</tr>
</tbody>
</table>

**EMGZ484T functionality:**
- Microprocessor based unit
- Expands system by 4 additional force sensors per unit.
- Provides stabilised sensor supply voltage
- Connected via internal RS485 bus to EMGZ482T and mounted on the rotating part of the machine
## EMGZ484R: Channel Extension Receiver

### Technical Data EMGZ484R

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation panel</td>
<td>Like EMGZ482R but expanded by additional LED-rows</td>
</tr>
</tbody>
</table>
| PLC Interface                | 2x analogue outputs 0...10VDC  
                              | 2x analogue outputs 0/4...20 mA  
                              | 4x relay outputs             |
| Control Interface            | Web browser / RTM PC software                                              |
| Channel Extension            | EMGZ484R-4CH boards (max.10)                                               |
| Wire Interface               | RS485 (proprietary)                                                        |
| Wireless Interface           | 2.4 GHz                                                                     |
| Resolution D/A               | 0...4096 (12 bits)                                                          |
| Power Supply                 | 24 VDC delivered from EMGZ482R                                              |
| Temp. Range                  | 0...50°C (32...220°F)                                                       |
| Protection Class             | IP52                                                                        |

### EMGZ484T functionality:
- Displays tension values on a bar-graph
- Provides 0...10V or 0/4...20mA analog outputs to connect to PLC.
- Parameter setting via web browser
- EMGZ484R-4CH boards inside housing
RTM X42.IOs: Battery and Charger

**Power Supply with Battery:**

- RTM X42 battery pack (6.7 Ah)
- Charger
- Battery autonomy:
  - for 42 channels ~8 hours
  - for 2 channels ~60 hours
RTM X42 Software

- The RTM X42.PC is offered as a package including FMS configured PC, pre-set and tested RTM-Software.
- The SW runs on PC with Windows OS (office basic 2007 package or higher).
- Precise, consistent monitoring of all tension data relevant to production (42 channels)
- Visualization and synchronization of tension data to the product by running length
- Sophisticated software for tension data analysis (incl: limit violations, alarms, quality reports)

Operator Screen
Data Evaluation / Alarms

Histogram Sheet:
- Shows all active channels
- Min. / Max. limits
- Errors (outliers) marked by point

Alarms:
- Outlier clearly recognizable and assigned to „running meter“.
- Min/max limit violations trigger an alarm. The RTM X42 receiver (EMGZ484R) switches a relay output which can activate flash light or it can also be used to turn off the machine.
Data Log, Limit Violations

Contains:
- Channel # where violation happened
- Allocation of violation to running meter / time
- Other production relevant data

Use of protocol:
- Quality purposes
- Production lot documentation

<table>
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<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Kanal 2</td>
<td>31</td>
<td>42.1</td>
<td>147.0</td>
<td>196.0</td>
<td>1000</td>
</tr>
<tr>
<td>Kanal 2</td>
<td>52.9</td>
<td>57.7</td>
<td>196.0</td>
<td>192.0</td>
<td>1000</td>
</tr>
<tr>
<td>Kanal 2</td>
<td>56.9</td>
<td>57.7</td>
<td>196.0</td>
<td>192.0</td>
<td>1000</td>
</tr>
<tr>
<td>Kanal 2</td>
<td>61.9</td>
<td>196.0</td>
<td>192.0</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>Kanal 2</td>
<td>70.9</td>
<td>80.3</td>
<td>1000</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>Kanal 2</td>
<td>73.9</td>
<td>84.1</td>
<td>1000</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>Kanal 2</td>
<td>78.9</td>
<td>84.1</td>
<td>1000</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>Kanal 2</td>
<td>102.9</td>
<td>88.9</td>
<td>1000</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>Kanal 2</td>
<td>105.9</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>Seele</td>
<td>107.9</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>Seele</td>
<td>150.9</td>
<td>61.3</td>
<td>1000</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>Seele</td>
<td>151.9</td>
<td>73.3</td>
<td>1000</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>Seele</td>
<td>164.8</td>
<td>82.3</td>
<td>1000</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>Seele</td>
<td>166.8</td>
<td>70.4</td>
<td>1000</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>Seele</td>
<td>170.8</td>
<td>53.7</td>
<td>1000</td>
<td>1000</td>
<td></td>
</tr>
</tbody>
</table>

Bemerkung: Erste und letzte Limitverletzung mit Unterdrückung des Fehlerverlaufs.
RTM X42 Sub-systems

For each application a suitable system:

- The **RTM X42.IO** is for monitoring application with up to 42 channels (ideally 6 to 18 channels). Analogue outputs provide controlling capability (requires slip rings for the controlling signal). Comfortable parameter setting over the web browser possible.

- The **RTM X42.PC** is for purely tension monitoring purposes. It is an ideal candidate for retrofitting existing machines with higher channel numbers. It offers excellent data processing and analysis capability for quality assurance and production effectiveness.

- The **RTM X42.PC/IO** combines the features of the **PC** and **IO** sub-system in one.

- The sub version **RTM X42.MODBUS** makes the system very appealing for stranding machine builders because of its fast bus interface. It allows real time control of breaks or drives in the machine.

- The sub version **RTM X42.MODBUS/PC** combines all advanced features of the RTM X42.MODBUS system with the excellent data processing and analysis capability of the system RTM X42.PC.
Radio Certification RTM X42

The component certifications of RTM X2 are also valid for the RTM X42-System.

- Certification granted for Europe (EU), EFTA-States, Switzerland
- RTM X42 passed FCC compliance tests for USA / Canada.
- Certification granted for Japan per 19 Aug. 2011.

<table>
<thead>
<tr>
<th>RTM X2 System</th>
<th>Radio Certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnitude of Test</td>
<td>Article 3.2 of Directive 1999/5/EC (R&amp;TTE Directive)</td>
</tr>
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</table>
| Certification | ETSI EN 300 440-2 V1.5.1 (2009-03)  
ETSII EN 300 440-1 V1.3.1 (2009-03) |

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<tr>
<th>RTM X2 System</th>
<th>EMC Certification</th>
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<tbody>
<tr>
<td>Magnitude of Test</td>
<td>ECM-Test according to 98/37/EC and 2004/108/EC harmonized</td>
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<tr>
<td>Emission/Immunity</td>
<td>ETSI EN 489-3; EN 61326-1</td>
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<tr>
<th>RTM X2 System</th>
<th>FCC Certification USA, Canada</th>
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</thead>
<tbody>
<tr>
<td>Magnitude of Test</td>
<td>Class A digital device, pursuant to Part 15 of the FCC Rules</td>
</tr>
<tr>
<td>Certification</td>
<td>FCC Registration #: 0020311882</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>RTM X2 System</th>
<th>CAB Radio Certification for Japan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnitude of Test</td>
<td>Low power Data communication FXD Article 38-24, Paragraph 1 of radio law</td>
</tr>
<tr>
<td>Certification</td>
<td>Article 2, Clause 1 Item 19 Certification ID #: 202WWSM10126721</td>
</tr>
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</table>
RTM X2 Radio Certification for Japan

CETECOM ICT Services GmbH
Unternehmerstrasse 6-10, D-66117 Saarbruecken, Germany

Conformity Assessment Body
Recognized Certification Body for Japan (CAB ID: 202)

認証書 TYPE- BASED CERTIFICATE

特定無線設備の確認
Classification of specified radio equipment:
(Ordinance concerning Technical Regulations Conformity Certification etc. of Specified Radio Equipment)
Article 2, Clause 1, Item 19

Low power data communications system in the 2.4GHz band

電波の形式、周波数
及ぶ空気電力
Type of emissions, frequency and antenna power

RXD
2412 – 2462MHz
0.00028W/MHz

挿入文書は名称
Model Name

RTM X2 (EMG2482T)

製造者名
Manufacturer Name

FMS Force Measuring Systems AG
Aspstrasse 6
8154
Oberglatt, Switzerland

識別番号
Certified Number

2022WWSM10126721

認証をした年月日
Certified Date

2011-08-19

上記のとおり、電波法第38条の24項の規定に基づく認証を行ったものであることを証する。

This is to certify that the above-mentioned Type certification has been granted in accordance with the provisions of Article 38-24, Paragraph 1 of the Radio Law.

CETECOM ICT Services GmbH
Lothar Spitzer

Recertified 19.01.2011

CB - Japan

TCB

GRANT OF EQUIPMENT AUTHORIZATION

Certification
Issued Under the Authority of the
Federal Communications Commission

by:

FMS Force Measuring Systems AG
Aspstrasse 6
8154
Oberglatt, Switzerland

Date of Grant: 08/22/2011
Application Dated: 08/22/2011

Attention: Thomas Lampen, Technical Director

NOT TRANSFERABLE

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is VALID ONLY for the equipment identified herein for use under the Commission's Rules and Regulations listed below:

FCC IDENTIFIER: XXEYMGZ2482R

Name of Grantee: FMS Force Measuring Systems AG

Equipment Class: Digital Transmission System

Identifiers:
Radio Transmitted Tension Monitoring System - Control Unit

Grant Notes

FCC Rule Parts
Output Power
Frequency Tolerance Emission Designator

15C
2412.0 – 2462.0
0.005 W

Power Output listed is conducted.

FCC - USA