SIEMENS

Ingenuity for life

SICAM short-circuit indicators

Fast fault location in medium-voltage cable and overhead line networks

siemens.com/short-circuit-indicator

SICAM short-circuit indicators for cable and overhead line networks:

Greater reliability, higher efficiency, lower costs

For modern distribution networks to operate efficiently, faults must be quickly detected, packed in messages, and made available for further processing. With its SICAM short-circuit and ground-fault detection devices, Siemens now offers devices for recording and reporting faults in medium-voltage power systems.

Prevent critical network situations – and seamlessly monitor the status of your distribution network.

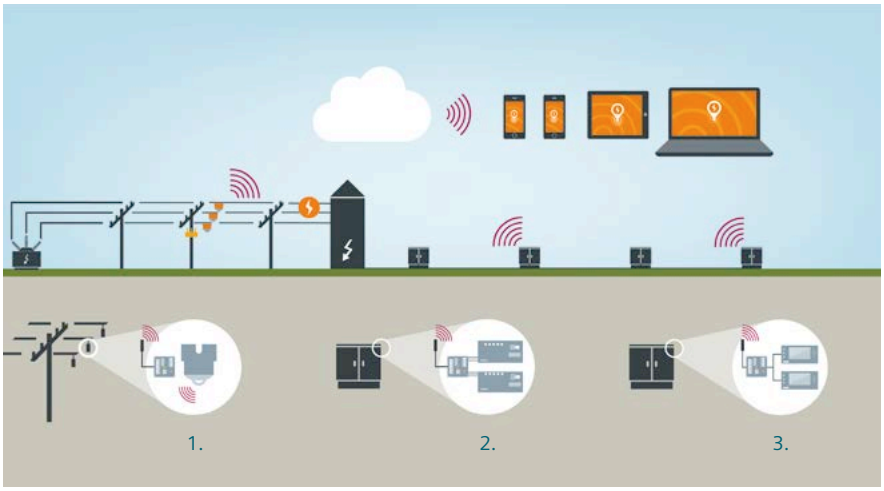
SICAM short-circuit indicators help you reduce downtimes and optimize network quality.

Efficiently increase the availability of your distribution network – and benefit from the continuous improvement of your power supply.

Highlights at a glance

- Fast fault location
- Improved efficiency
- Flexible use
- High availability
- Easy installation and commissioning
- No maintenance

Detect, report, benefit



1. SICAM FSI & SICAM FCG

Detect short-circuits and ground faults in medium-voltage overhead line networks with SICAM FSI (Fault Sensor Indicator).

2. SICAM FPI & SICAM FCG

The SICAM Fault Passage Indicator (FPI) is used to detect and report phase and ground faults in medium-voltage cable networks.

3. SICAM FCM & SICAM FCG

As a short-circuit and ground-fault indicator with direction indication, SICAM FCM offers additional, precise measured values for monitoring the load of distribution networks.

1/2/3

With SICAM FCG (Fault Collector Gateway), you can transfer all reported faults to a control center via GPRS or to a service team via SMS. Our cloud solution also allows you to work independently of a control center.

SICAM FSI (Fault Sensor Indicator)

SICAM FCG (Fault Collector Gateway)

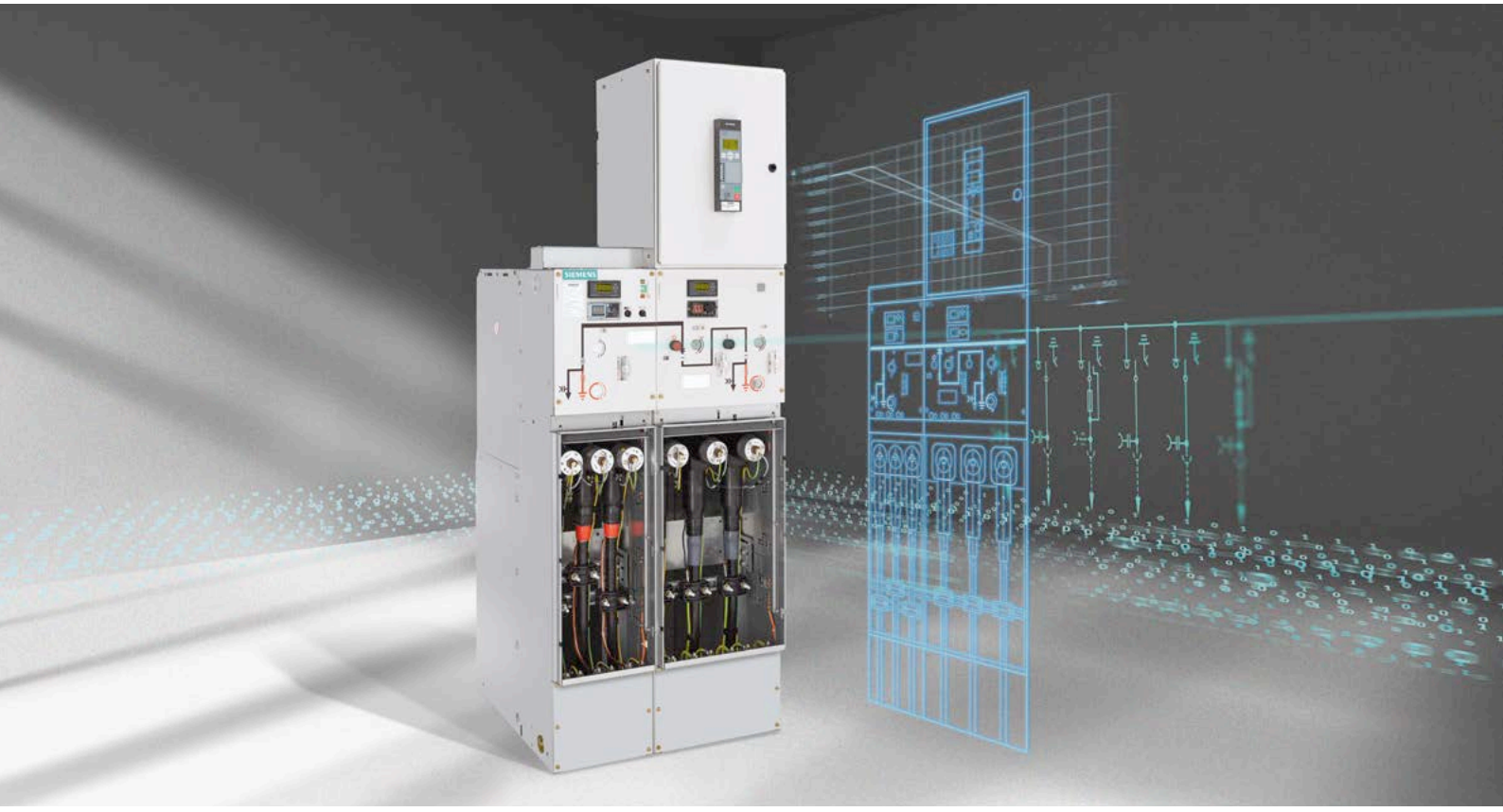
SICAM FCM (Feeder Condition Monitor)

SICAM FPI (Fault Passage Indicator)

The power team:
Low investment,
high power

SICAM FCM and low-power sensors:

A finger on the pulse of your distribution network



Everything under control

Do you want to improve the quality of your network? Then take advantage of a complete portfolio of products for network monitoring, power quality recording, fault recording, phasor measurement, and system software applications.

SICAM FCM (Feeder Condition Monitor) is a short-circuit and ground-fault indicator with direction indication that uses protection algorithms and low-power sensor technology according to IEC 60044. Alternatively, SICAM FCM can also be connected to a capacitive voltage tap to allow cost-effective directional fault detection in the cable network. Another possibility is the provision of up-to-date measured values via the integrated Modbus RTU interface, which permits you to make an accurate assessment of your distribution system.

SICAM FCM can be used with all medium-voltage switchgear types in grounded, isolated, and resonant-grounded systems.

Take advantage of high measuring accuracy and use SICAM FCM for investment planning in your distribution network.

We find your faults

To remedy faults – for example, cable faults due to excavation work – you must be able to locate them in the distribution network as quickly as possible.

Order no. (MLFB):

6MD2321-1AA00-1AA0
Resistive voltage measurement

6MD2322-1AA00-1AA0
Capacitive voltage measurement

only in conjunction with
6MD2322-0AA80-0AB3
connection cable to
voltage detecting system (VDS)

Take advantage of these benefits

- **Universal short-circuit and ground-fault recording** with directional fault detection in grounded, isolated, and resonant-grounded MV cable networks
- **Minimal loss of network fees/end customer fees** thanks to service restoration times ranging in minutes or even seconds (depending on the primary equipment).
- **High measuring accuracy** guaranteed by the use of high-quality measurement equipment and low-power sensor technology according to IEC 60044.
- **Reduced commissioning effort** enables the use of low-power sensors and the associated automatic adjustment to primary values (without calibration or adjustment effort).
- **Simplified parametrization and measured value transmission** by connecting to the SICAM A8000 remote terminal unit via Modbus.

Standard-compliant sensors:

For every process connection

High measuring accuracy for all medium-voltage switchgear types

Resistor dividers enable precise, linear measurements

Can also be used to connect 1 A and 5 A transformers in existing systems

Your configuration options, depending on your requirements

Order nos. (MLFB)

6MD2320-0GA00-1AA0

Phase current sensor
Type 225 mV@300 A, IEC 60044-8
Accuracy class 1; ext. 200 %; 5P10

6MD2320-0AF00-1AA0

Summation current sensor
Type 225 mV@60 A, IEC 60044-8
Accuracy class 1

6MD2320-0AA10-1AA0

1 A adapter
3 inputs
1 A to 225 mV low-power signal

6MD2320-0AA20-1AA0

5 A adapter
3 inputs
5 A to 225 mV low-power signal

6MD2320-0AA04-1AA0

10 kV voltage sensor
10 kV / √3 → 3,25 V / √3, IEC 60044-7
Accuracy class 1
for T-plug with symmetric C cone

6MD2320-0AA04-1AB0

10 kV voltage sensor
10 kV / √3 → 3,25 V / √3 IEC 60044-7
Accuracy class 1
for T-plug with short asymmetrical C cone

6MD2320-0AA07-1AA0

20 kV voltage sensor
20 kV / √3 → 3,25 V / √3, IEC 60044-7
Accuracy class 1
for T-plug with symmetric C cone

6MD2320-0AA07-1AB0

20 kV voltage sensor
20 kV / √3 → 3,25 V / √3, IEC 60044-7
Accuracy class 1
for T-plug with short asymmetrical C cone

6MD2322-0AA080-0AB3

Four-wire cable for connecting SICAM FCM to capacitive LRM voltage testing systems

SICAM FCM for reliable measured values:

Innovative and high-precision

A first for sensors

SICAM FCM is the first short-circuit indicator that supports standard-compliant sensors for measuring current and voltage according to IEC 60044-7/-8. The excellent result: It enables high-precision measurement without calibration or adjustments to the primary values.

SICAM FCM:
Developed for practical use

99,5 % accuracy

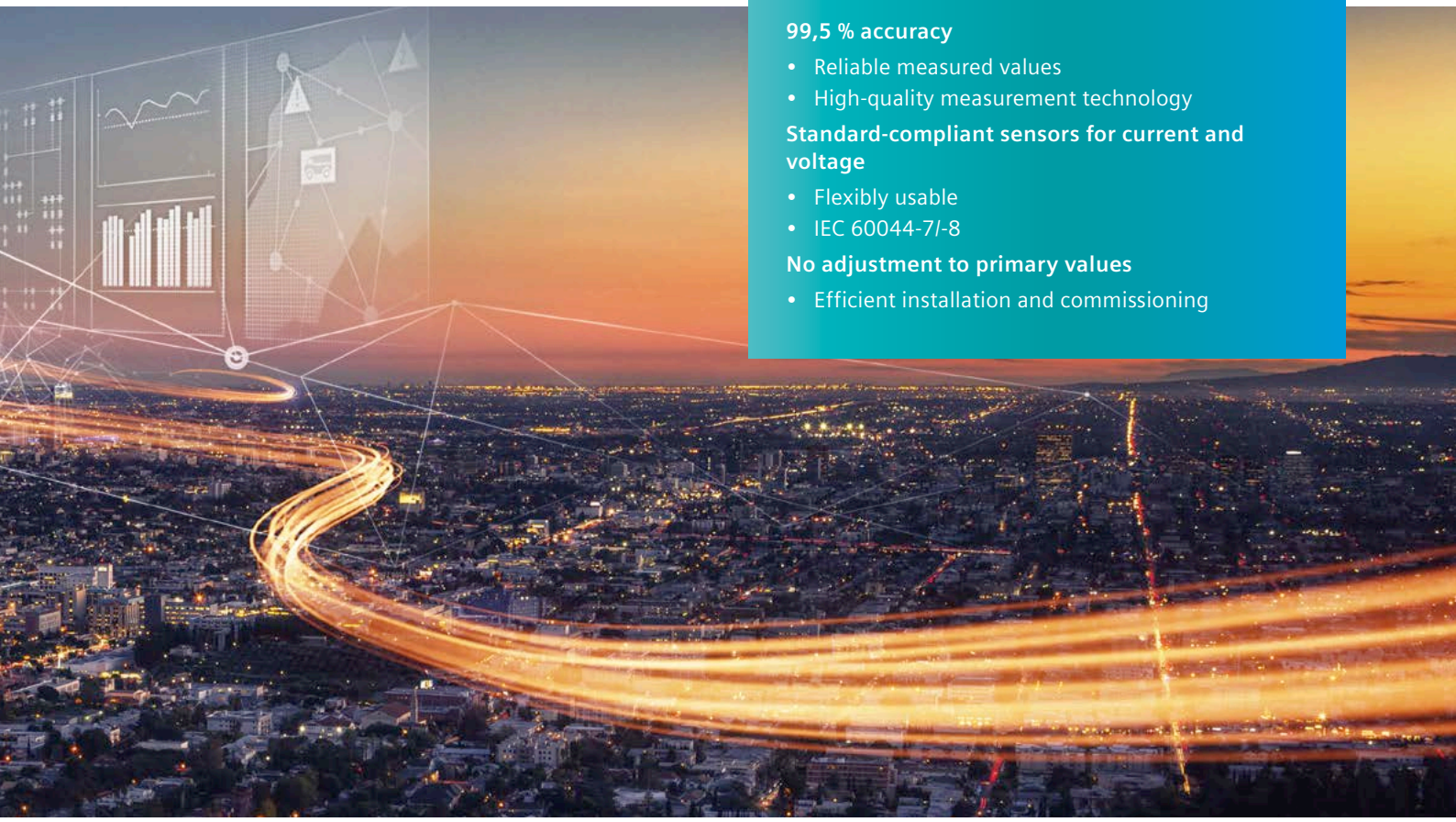
- Reliable measured values
- High-quality measurement technology

Standard-compliant sensors for current and voltage

- Flexibly usable
- IEC 60044-7/-8

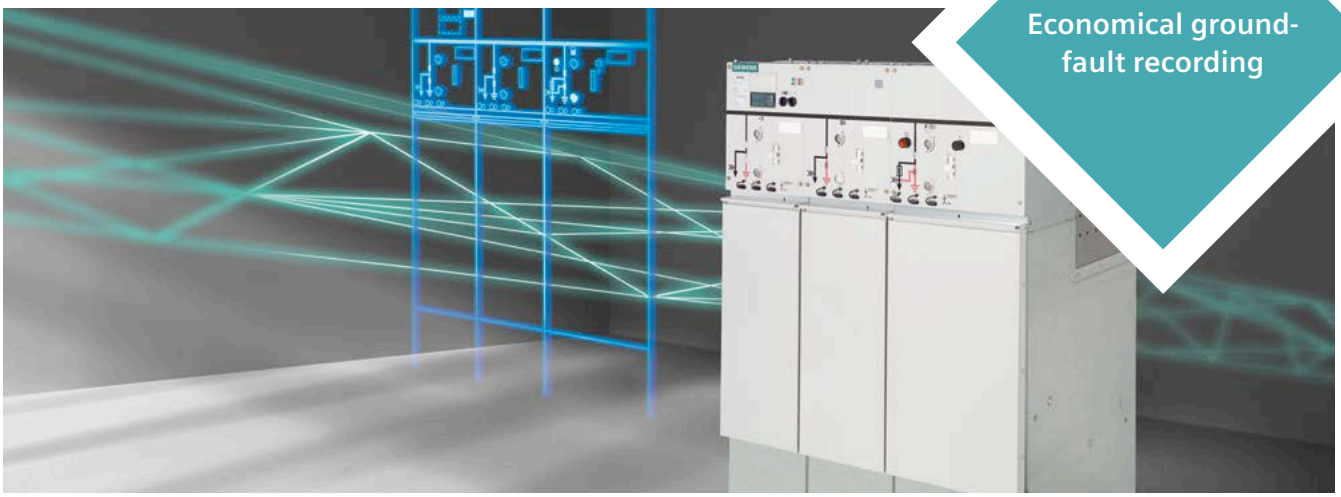
No adjustment to primary values

- Efficient installation and commissioning



SICAM FPI:

The guardian of underground cable networks



Economical ground-fault recording

Save time and money thanks to reduced downtimes:

Rely on SICAM FPI (Fault Passage Indicator) – the simple, economical solution for efficiently operating modern distribution networks.

SICAM FPI reliably detects and reports ground and phase faults in radial and open ring cable networks.

The threshold values of the permissible currents can be set at the four current sensors (L1, L2, L3, and E). In the event of a fault, the sensors send an optical signal to SICAM FPI via a fiber-optic cable – fail-safe and isolated.

The LEDs on SICAM FPI permit local indication. Using the binary contacts, they can forward fault messages to connected remote terminal units.

Take advantage of these benefits

- **Reduced fault-related costs and increased availability** thanks to the fast detection of phase and ground faults in MV cable networks.
- **Minimal operating costs** with a maintenance-free, self-sufficient system that reliably operates with the aid of the back-up battery in SICAM FSI even if the main supply is tripped.
- **Economical installation and a long service life** guaranteed by easy-to-retrofit, IP67-compliant sensors with an interference-immune fiber-optic connection to SICAM FPI.

Order nos. (MLFB):

Sensor type 1 (< 10 % accuracy)

Current sensor for phase faults: AC 200 A to 1,200 A
Current sensor for ground faults: AC 10 A to 100 A

6MD2310-0AA00-0AA0

Ground-fault and short-circuit indicator with 2 binary outputs,
3 phase-fault + 1 ground-fault current sensor (for L1 / L2 / L3 / E)

6MD2310-0DA00-0AA0

Ground-fault and short-circuit indicator with 1 binary output,
3 phase-fault + 1 ground-fault current sensor (for L1 / L2 / L3 / E)

6MD2310-0BB00-0AA0

Short-circuit indicator with 1 binary output,
3 phase-fault current sensors (for L1 / L2 / L3)

6MD2310-0CC00-0AA0

Ground-fault indicator with 1 binary output,
1 ground-fault current sensor (for E)

6MD2310-0EC00-0AA0

Ground-fault indicator with 2 binary outputs,
1 ground-fault current sensor (for E)

Sensor type 2 (< 15 % accuracy)

Current sensor for phase faults: AC 200 A to 800 A
Current sensor for ground faults: AC 40 A to 300 A

6MD2310-0AE00-0AA0

Ground-fault and short-circuit indicator with 2 binary outputs,
3 phase-fault + 1 ground-fault current sensor (for L1 / L2 / L3 / E)

6MD2310-0DE00-0AA0

Ground-fault and short-circuit indicator with 1 binary output,
3 phase-fault + 1 ground-fault current sensor (for L1 / L2 / L3 / E)

6MD2310-0BF00-0AA0

Short-circuit indicator with 1 binary output,
3 phase-fault current sensors (for L1 / L2 / L3)

6MD2310-0CG00-0AA0

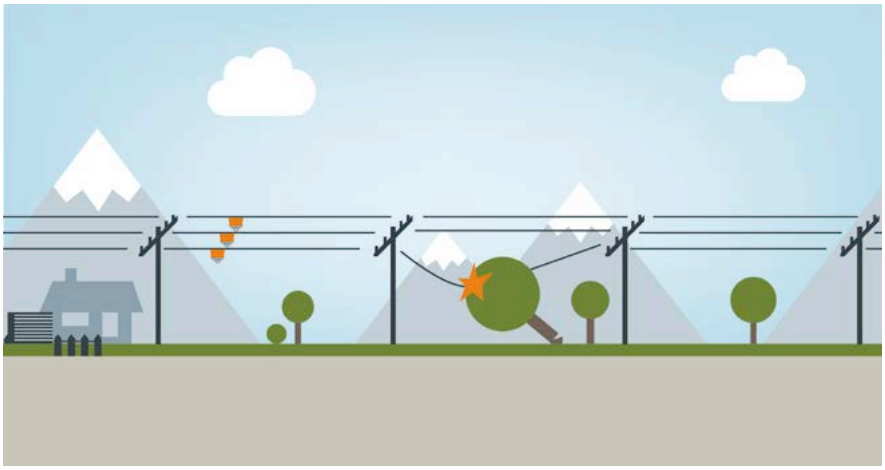
Ground-fault indicator with 1 binary output,
1 ground-fault current sensor (for E)

6MD2310-0EG00-0AA0

Ground-fault indicator with 2 binary outputs,
1 ground-fault current sensor (for E)

SICAM FSI:

Fault control in overhead line networks



Boost the performance of your overhead line network by reducing downtimes:

With the SICAM FSI (Fault Sensor Indicator) short-circuit and ground-fault detection system, we offer you the right solution for reliable fault recording in medium-voltage overhead line networks from 3.3 kV to 66 kV.

Choose between two device versions: without communication and with local indication only; with communication and with local indication.

SICAM FSI reliably communicates with SICAM FCG via the encrypted, wireless network ZigBee.

Even installation is incredibly easy: The device is clamped onto the overhead line via the hotstick.

Order nos. (MLFB):

6MD2314-1AB10
Local display only

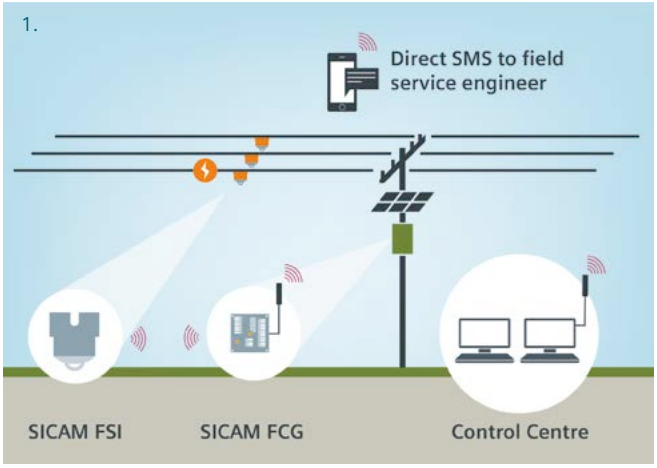
6MD2314-1AB11
With integrated communication

Take advantage of these benefits

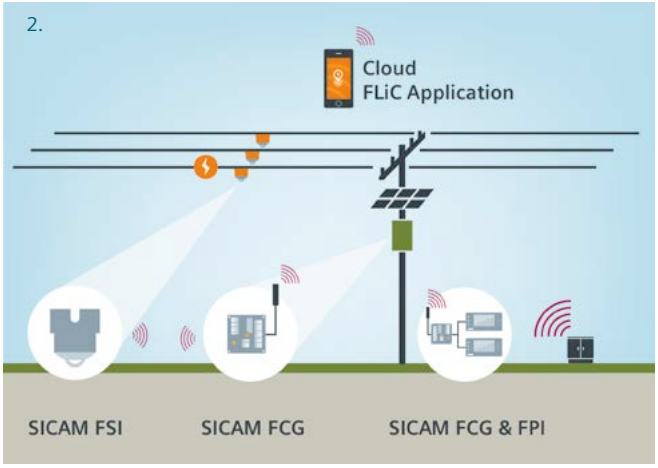
- **Better service performance by the maintenance team** thanks to precise fault location and local fault indication by means of a flashing light (depending on fault type) and remote indication.
- **Low maintenance costs** thanks to self-sustained sensors in the device, a high backup-battery life, and no maintenance for 10 years.
- **Quick and easy commissioning** using the QR code on the device and a Web browser.

SICAM FCG:

Reliable transmission of messages



1. Direct connection to a control center:
Messages are sent to a control center using a standardized telecontrol protocol.



2. Fault message in the cloud
Messages are sent directly to maintenance teams, without the need for a control center.

SICAM FCG (Fault Collector Gateway) establishes the connection to a control center via GPRS and sends messages using the standardized telecontrol protocol IEC 60870-5-104. To locate a fault more quickly, SICAM FCG can also send an SMS directly to the cell phone of a service technician.

An alternative is the "cloud solution": Using the XMPP protocol, fault messages and locations are visualized in the FLiC application on a smartphone. Maintenance teams are immediately informed – without control centers, without complex IT hardware, and incredibly economically.

For more information, visit:
siemens.com/flic

Order nos. (MLFB):

6MD2340-3JM70-8AA2
Without antenna

6MD2340-3JM71-8AA2
With antenna

Take advantage of these benefits:

- **Minimized commissioning effort** thanks to simple connection to a control center via GPRS using the standardized telecontrol protocol IEC 60870-5-104.
- **Reduced service costs** thanks to direct fault messages from the overhead line to the maintenance team via SMS or the FLiC application on a smartphone.
- **Low operating costs** thanks to a fully autonomous power supply via a PV buffered battery.

Published by
Siemens AG 2018

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Article No. EMDG-B10129-00-7600
Printed in Germany
Dispo 06200
HL17103333 WS 04181.0