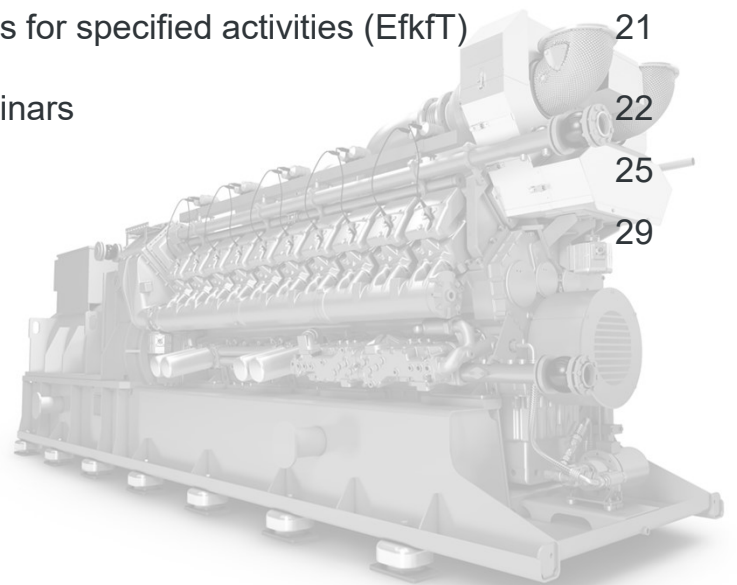


Training Center Service

Seminar program for operators 2020

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Service Training at Caterpillar Energy Solutions GmbH - A Valuable Investment

Training offers for the operator

The right know-how is the most important basic prerequisite for qualified operation and offers the possibility of locating simple system malfunctions and rectifying them yourself.

Central and decentralized trainings

The courses are held at the Training Centers in Mannheim, Singapore, Atlanta (USA) or Wuxi (China), but can also be organized on-site on request.



Worldwide Training Center Locations

There are currently 4 Training Center locations available around the world. The newest location is Wuxi in China, which opened in 2019. Further locations will follow and will be communicated within the training program.

All locations can offer different trainings in different languages depending on the location and the population. On the following pages you will find further information on the individual locations. Please do not hesitate to contact the appropriate contact person if you have any questions about training courses.



Welcome to the Caterpillar Energy Solutions GmbH Training Center Mannheim

Caterpillar Energy Solutions
GmbH
Training Center
Carl-Benz-Strasse 1
68167 Mannheim, Germany
Phone: +49 621 384 9955
Mail: training@mwm.net



**Head of Training
Center**
Tobias Marnet

Welcome to Caterpillar Energy Solutions GmbH Training Center Mannheim - our team for your success



**Administration
Training Center**
Petra Kupka



**Access Authorization
Control Units**
Svenja Hangg



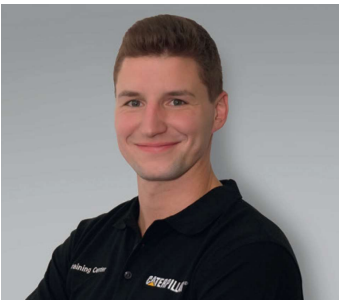
**Trainer Gas Engine
Technology**
Günter Tomiczek



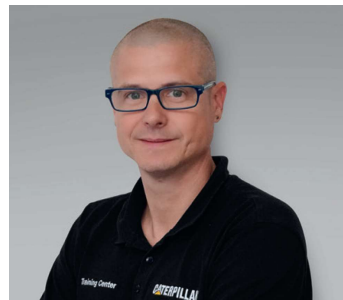
**Trainer Gas Engines &
Electrical Engineering**
Werner Schlenker



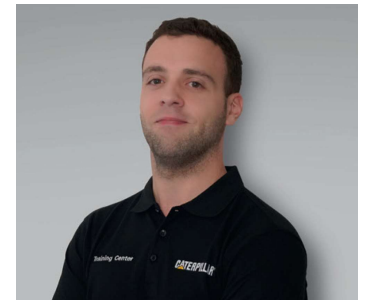
**Trainer
Electrical Engineering**
Ralf Krauß



**Trainer Gas Engine
Technology**
Alexander Klotz



**Trainer
Electrical Engineering**
Fabian Habel



**Trainer Gas Engine
Technology**
Philipp Scherhag



**Trainer Gas Engine
Technology**
Abdul Soueidan



Welcome to Caterpillar Energy Solutions GmbH Training Center Singapore

Caterpillar Energy Solutions
Asia Pacific Pte. Ltd.
Service & Training Department
11 Kian Teck Road
Singapore 628768
Phone: +65 6308 9292
Mail: claire.tan@mwm.net

Welcome to Caterpillar Energy Solutions GmbH Training Center Singapore - our team for your success



Administration
Training Center
Claire Tan



Trainer
Tang Kok Seng



Trainer
Md Nur Islam



Welcome to Caterpillar Energy Solutions GmbH Training Center Atlanta (USA)

**Caterpillar Energy Solutions Inc.
Sales & Service**

4955 Marconi Dr, Alpharetta

GA 30005, USA

Phone: +1 770 279 6720

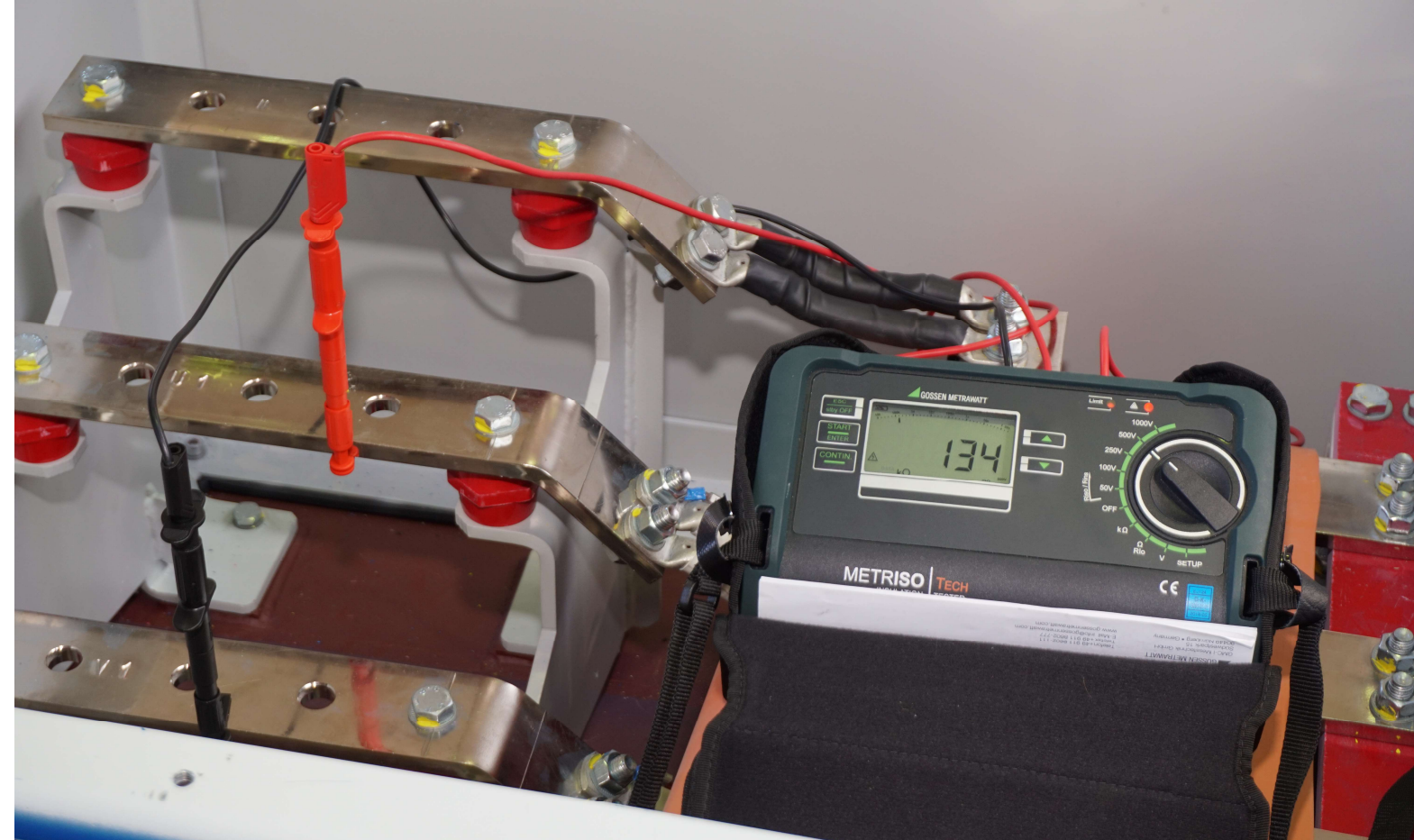
Mail: usa.service@mwm.net

Welcome to Caterpillar Energy Solutions GmbH Training Center Atlanta - our team for your success



**Administration
Training Center /
Trainer**

Karlton Sutherland



Welcome to Caterpillar Energy Solutions GmbH Training Center Wuxi (China)

MWM Training Center Service

Caterpillar R&D Center (China) Co., Ltd.

Lot B6-D, National High-Tech Development, 214028 Zone Jiangsu

Tel.: 13911129987

Mail: jie.zhao@mwm.net

Courses available at the individual Training Centers

Training Type	Mannheim	Singapore	Atlanta (USA)
Gas Engines TCG 2016 Series Operator Level	•	•	•
Gas engines TCG 2020 series Operator level	•	•	•
Gas Engines TCG 2032 Series Operator Level	•	•	•
Gas Engines TCG 3016 Series Operator Level	•		•
Gas Engines TCG 3020 Series Operator Level	•		
Annual instruction for electrotechnically instructed persons (EUP)	•		
Annual instruction for EfkfT and electricians	•		
TEM Level 100 (customer Dongle)	•	•	•
TPEM Level 100 (customer Token)	•	•	•

For trainings in China, please contact the contact person of the Chinese Training Center directly.

The way to a qualified and competent operator

Trainings on all systems

The contents of the training courses serve to convey the structure and function of the engines. The ability to operate the motors and systems ensures additional safety for subsequent practical use. Problem cases can be specifically dealt with by means of independent system testing and error handling using measurement technology.

Trainings for operators

TEM Level 100 (customer Dongle)			TPEM Level 100 (customer Token)	
gas engines model series TCG 2016 Operator Level	gas engines model series TCG 2020 Operator Level	Gas engines Series TCG 2032 / 2032 B Operator Level	gas engines model series TCG 3016 Operator Level	gas engines model series TCG 3020 Operator Level

Annual instruction in electrical engineering

Annual instruction for electrotechnically instructed persons (EUP)	Annual training for electricians and electricians for specified activities (EFKfT)
--------------------------------------------------------------------	------------------------------------------------------------------------------------

Series TCG 2016 Operator Level

General Information

reference	The seminars deal exclusively with the engine and include the maintenance levels E 10 to E 40.
prerequisites	Thorough knowledge of gas engine technology is an advantage
target audience	Customers and operators
duration	5 days
number of participants	max. 12

Course Contents

In this seminar we will briefly discuss the performance spectrum of MWM engines. You will receive an overview of the service documentation and learn more about the structure and function of the TCG 2016 as well as the modules and systems. You will also receive all necessary information about the operation of the engine with regard to lubricants and coolants. You will learn all the necessary details, such as maintenance, inspection and repair of the maintenance levels E10 to E40 and will be able to assemble/disassemble the parts involved in those maintenance levels. You will be able to assess the coolant and lubricating oil as well.

As the main component of the TEM engine control you will get to know all the essential details of the user interface as well as details on engine control (auxiliary unit test mode, ignition system, histories, operating log, anti-knock control, etc.).

A tour of our production plant rounds off the training week.

Series TCG 2020 Operator Level

General Information

reference	The seminars deal exclusively with the engine and include the maintenance levels E 10 to E 40.
prerequisites	Thorough knowledge of gas engine technology is an advantage
target audience	Customers and operators
duration	5 days
number of participants	max. 12

Course Contents

In this seminar we will briefly discuss the performance spectrum of MWM engines. You will receive an overview of the service documentation and learn more about the structure and function of the TCG 2020 as well as the modules and systems. You will also receive all necessary information about the operation of the engine with regard to lubricants and coolants. You will learn all the necessary details, such as maintenance, inspection and repair of the maintenance levels E10 to E40 and will be able to assemble/disassemble the parts involved in those maintenance levels. You will be able to assess the coolant and lubricating oil as well.

As the main component of the TEM engine control you will get to know all the essential details of the user interface as well as details on engine control (auxiliary unit test mode, ignition system, histories, operating log, anti-knock control, etc.).

A tour of our production plant rounds off the training week.

Series TCG 2032 Operator Level

General Information

reference	The seminars deal exclusively with the engine and include the maintenance levels E 10 to E 40.
prerequisites	Thorough knowledge of gas engine technology is an advantage
target audience	Customers and operators
duration	5 days
number of participants	max. 12

Course Contents

In this seminar we will briefly discuss the performance spectrum of MWM engines. You will receive an overview of the service documentation and learn more about the structure and function of the TCG 2032 as well as the modules and systems. You will also receive all necessary information about the operation of the engine with regard to lubricants and coolants. You will learn all the necessary details, such as maintenance, inspection and repair of the maintenance levels E10 to E40 and will be able to assemble/disassemble the parts involved in those maintenance levels. You will be able to assess the coolant and lubricating oil as well.

As the main component of the TEM engine control you will get to know all the essential details of the user interface as well as details on engine control (auxiliary unit test mode, ignition system, histories, operating log, anti-knock control, etc.).

A tour of our production plant rounds off the training week.

Series TCG 3016 Operator Level

General Information

reference	The seminars deal exclusively with the engine and include the maintenance levels E 10 to E 40.
prerequisites	Thorough knowledge of gas engine technology is an advantage
target audience	Customers and operators
duration	5 days
number of participants	max. 12

Course Contents

In this seminar we will briefly discuss the performance spectrum of MWM engines. You will receive an overview of the service documentation and learn more about the structure and function of the TCG 3016 as well as the modules and systems. You will also receive all necessary information about the operation of the engine with regard to lubricants and coolants. You will learn all the necessary details, such as maintenance, inspection and repair of the maintenance levels E10 to E40 and will be able to assemble/disassemble the parts involved in those maintenance levels. You will be able to assess the coolant and lubricating oil as well.

As the main component of the TPEM engine control, you will learn all the essential details of the user interface, as well as details on engine control (auxiliary unit test mode, ignition system, histories, operating log, anti-knock control, etc.).

A tour of our production plant rounds off the training week.

Series TCG 3020 Operator Level

General Information

reference	The seminars deal exclusively with the engine and include the maintenance levels E 10 to E 40.
prerequisites	Thorough knowledge of gas engine technology is an advantage
target audience	Customers and operators
duration	5 days
number of participants	max. 12

Course Contents

In this seminar we will briefly discuss the performance spectrum of MWM engines. You will receive an overview of the service documentation and learn more about the structure and function of the TCG 3020 as well as the modules and systems. You will also receive all necessary information about the operation of the engine with regard to lubricants and coolants. You will learn all the necessary details, such as maintenance, inspection and repair of the maintenance levels E10 to E40 and will be able to assemble/disassemble the parts involved in those maintenance levels. You will be able to assess the coolant and lubricating oil as well.

As the main component of the TPEM engine control, you will learn all the essential details of the user interface, as well as details on engine control (auxiliary unit test mode, ignition system, histories, operating log, anti-knock control, etc.).

A tour of our production plant rounds off the training week.

TEM L100 (customer Dongle)

General Information

reference	The seminar deals with the TEM motor control system.
prerequisites	Successful participation in one of the operator level trainings for one of the existing TCG 20XX / TCG 30XX series
target audience	Customers and operators
duration	5 days
number of participants	max. 10

Course Contents

In this training you will receive detailed knowledge about:

- Operating the Genset with the TEM System
- The structure of the TEM control cabinet and the other hardware components of the TEM System
- The Authorization Concept of the TEM System
- TEM motor control with detailed information on the motor parameters according to the authorization level
- Using the Test Mode
- Storing histories and diagrams for troubleshooting purposes
- Practical exercises based on practical case studies for troubleshooting
- Background information on PID settings
- Use the documentation and descriptions according to the permission level.
- NEW: NOx or combustion chamber temperature setting with level 100 (from TEM version 2.50.22)

The successfully passed final test entitles you to use a TEM Level 100 Dongle (the Dongle is not included in the price of the training).

TPEM L100 (customer Token)

available Q2 2020

General Information

reference	The seminar deals with the TPEM motor control system.
prerequisites	Successful participation in one of the operator level trainings for one of the existing TCG 20XX / TCG 30XX series
target audience	Customers and operators
duration	5 days
number of participants	max. 10

Course Contents

In this training you will receive detailed knowledge about:

- Operating the Genset with the TPEM System
- The structure of the TPEM control cabinet and the other hardware components of the TPEM System
- The Authorization Concept of the TPEM System
- TPEM motor control with detailed information on the motor parameters according to the authorization level
- Using the Test Mode
- Storing histories and diagrams for troubleshooting purposes
- Practical exercises based on practical case studies for troubleshooting
- Background information on PID settings
- Use the documentation and descriptions according to the permission level.
- NOx or combustion chamber temperature setting with level 100 (from TPEM version 1.5)

The successfully passed final test entitles you to use a TPEM Level 100 Token (the Token is not included in the price of the training).

Annual instruction for Electrically instructed persons (EUP)

General Information

reference	The annual training is aimed at EUP as an annual refresher training.
prerequisites	Appointment to the EUP
target audience	Customers and operators
duration	1 day
number of participants	max.10

Course Contents

In this training you will receive detailed knowledge about:

- The fundamentals of electrical engineering and electrical current (protective measures and accident prevention are a major focus here)
- The dangers and effects of electric current on the human body
- Protective measures against direct and indirect contact, examination of protective measures
- Accident prevention when working on electrical systems
- Definition of permissible activities of the EUP (Electrically instructed person)
- Your personal protective equipment
- accident causes
- Behaviour in an emergency

Annual training for electricians and electricians for defined activities

General Information

reference	The annual instruction is aimed at electricians and at EFKfT as annual repetition training.
prerequisites	Designation to the EFKfT or EFK
target audience	Customers and operators
duration	1 day
number of participants	max.10

Course Contents

In this training you will receive detailed knowledge about:

- The fulfilment of the requirements for recurring instruction according to § 12 ArbSchG and DGUV regulation 1 and maintenance of the certificate of competence
- Refreshing existing electrical engineering expertise
- Recognizing hazards and risks, correctly assessing hazards to minimize electrical accidents
- The dangers of electric current and effects on the human body
- The application of the 5 safety rules in practice (working in a de-energised state)
- Installation and modification of low-voltage systems up to 1000 V AC according to VDE 0100
- The requirements for persons working in the electrical sector according to DIN VDE 1000-10 and DGUV regulations
- Testing electrical systems and equipment in accordance with BetrSichV
- Operation and handling of electrical systems (according to DIN EN 50110-01)
- Tasks and duties of the electrician
- Behaviour in an emergency
- Personal protective equipment
- The causes of the accident

Conditions for orders and participation in seminars

Participation in seminars.

General information

With the publication of this seminar program, all previously published programs lose their validity. The conditions and seminar fees stated in this brochure for the respective seminars shall apply to orders and execution. We reserve the right to change prices. All prices quoted do not include value added tax.

- The seminar fees include one copy each of the participant's documents, the provision of working clothes and writing utensils, a selection of cold and hot drinks during the seminar breaks, lunch in the company restaurant (also vegetarian - no halal/kosher food) and, if successful, a certificate of participation or a certificate.
- Participation in the seminars is only possible after prior and confirmed registration and only in the selected seminar(s). Persons arriving on their own initiative, without confirmed registration, cannot be considered.
- If a seminar registration confirmed by the Training Center is not used, the budgeted cancellation fees apply (exception: if a medical certificate is presented in case of unforeseen illness). The posting of a replacement participant is possible without additional fees.
- For special seminars, the cancellation fees shown also apply. For special seminars with an external venue, any transport costs already incurred for seminar equipment as well as any costs incurred for flight and hotel cancellations will also be invoiced.

- For participants from foreign service partners, the customer must ensure that there is sufficient health and accident insurance for the participant(s) valid for the stay in Germany, which must be documented by the customer with a corresponding certificate on request. Any costs incurred by Caterpillar Energy Solutions GmbH as a result of missing or insufficient insurance are to be reimbursed by the customer.

Login and registration

- The binding registration takes place exclusively via our registration form, which must be completed completely and signed and sent to us by e-mail or fax.
- By participating in the seminars, the customer declares his binding acceptance of the conditions laid down in this publication.
- Registration can only be made via the responsible service partner of Caterpillar Energy Solutions GmbH.

Conditions for orders and participation in seminars

Reservation Period

The reservation period is indicated in the offer. After the reservation period has expired, the reserved seats will be released for other requests without further reminder.

Cancellation/Name Change/Course Cancellation

- Name changes and exchange of participants are possible until the beginning of the seminar.
- In case of a complete cancellation, cancellation fees according to the price list are due (exception in case of illness with presentation of a medical certificate).
- In the case of on-site seminars, the costs for flight/train and/or hotel cancellations will be charged additionally in the event of cancellation.
- The Training Center reserves the right to cancel seminar dates for important reasons, e.g. insufficient number of participants (at least 4 participants), illness of the seminar leader, etc. The Training Center reserves the right to cancel seminar dates at any time. The customer shall be informed of this in advance within a reasonable period of time and of any possible new date.

Accommodation/Arrival/Parking

- We are happy to take over the hotel booking in one of our contracted hotels. Please indicate the arrival and departure dates on the registration form. Accommodation costs and hotel services or cancellation fees are not included in the seminar fees and must be paid directly at the hotel upon departure.

- On request we offer a shuttle service for overnight stays in one of our partner hotels. Please indicate on the registration form.
- Visitors to the Training Center in Mannheim only have limited parking (parking spaces 50-53, keep left at the entrance). It is recommended to use the shuttle service and the parking spaces of the hotels.

Course Languages/Interpreters

All seminars are available in German and English. Seminars in Russian, French and Italian are offered with our qualified interpreters. Seminars in other languages can be held if the company commissions a trained interpreter with technical language skills. Seminars with interpreters are special seminars, and at least 4 participants must be registered.

Disclaimer

The respective event will be carefully prepared and carried out according to the current state of the art. We assume no liability for advice given or the use of knowledge acquired.

Conditions for orders and participation in seminars

Data Protection

With the registration the current valid data protection regulations are recognized.

You can find them at:

<https://caterpillar-energy-solutions.de/home/datenschutz/>

Please send inquiries and registrations to the contact address of the respective Training Center.

Fees

For training courses held in the Training Center	EUR	USD
Per seminar day and participant The seminar fees listed for the events held in the Training Centers include hot and cold drinks, lunch in the company restaurant and the provision of working clothes. Not included are hotel costs to be settled directly by the participant / customer with the respective hotel.	580	660

For external trainings	EUR	USD
Per trainer/application/seminar day Plus travel expenses	2.430	2.760
Per travel day of the trainer	1.435	1.630
Other arrival and departure costs, flight/rail ticket, taxi, visa fees, etc.	According to expenditure	
Accommodation and meals	1) + 2)	
Shipping costs for engines, special tools, customs duties, etc.	According to expenditure	

- 1) Daily flat rates according to the rates of the respectively valid travel guidelines of Caterpillar Energy Solutions GmbH
- 2) If necessary plus additional costs for overnight stay and/or board

Cancellation fees for trainings	EUR	USD
Handling fee for each cancellation	285	330
from the 20th day to the 11th day before the start of the seminar	40% of the training fee	
from the 10th day to the 7th day before the start of the seminar	60% of the training fee	
from the 6th day to the 1st day before the start of the seminar	80% of the training fee	
on the day of arrival and in case of non-appearance without cancellation	100% of the training fees	
Plus any costs incurred for flight and hotel cancellations, as well as any costs already incurred for shipping seminar accessories.	According to expenditure	

All aforementioned prices do not include value added tax.

Fees

TEM EVO - Total Electronic Management	EUR	USD
Hardware USB Dongle Level 100 (+ initial setup fee)	900	1.050
USB Dongle initial setup fee The first edition will only be issued after training and is not included in the fees for the training. A Dongle order without training is not possible.	2.650	3.070
Annual usage fee USB Dongle	180	210
Additional expenditure Emergency enquiries Runtime extension for expired Dongle	355	410
Additional Programming Dongle per Change/Extension/Genset Maximum costs of 1.340 EUR / 1.560USD (corresponds to 4 x additional programming of 335 EUR / 390 USD)	355	410
Hardware Key set TEM1 / TEM Compact / TEM EVO	160	190

All aforementioned prices do not include value added tax.

Fees

Updates / Extensions for TEM Jview Software Packages	PC-User/ PC-Serv EUR	PC-User/ PC-Serv USD
Update from 2.XXXX to 3.XXXX	665	760
Extension Softmodem Since Dual-Use Good, the first delivery is made on CD.	365	420
Update from 1.XXXX to 3.XXXX	2.115	2.400

TEM Jview software packages (latest version)	PC user EUR	PC-Serv EUR	PC user USD	PC Serv USD
Software without softmodem with license Dongle	4.055	6.210	4.600	7.040
Software with softmodem with license Dongle Since Dual-Use Good, the first delivery is made on CD.	4.195	6.350	4.760	7.200
Loss of license Dongle (red) for Jview software	new purchase	new purchase	new purchase	new purchase

Upgrade license Dongle (PC-User PC-Serv) for TEM Jview	EUR	USD
Starting with version 3.XXXX	3.225	3.660
Version 2.XXXX and higher	1.850	2.100
As of version 1.XXXX	3.810	4.320

All aforementioned prices do not include value added tax.

Fees

TPEM - Total Plant Electronic Management	EUR	USD
TPEM Remote Client	Free of charge	Free of charge
Hardware USB-Token Level 50 or Level 100	500	570
USB Token initial setup fee Level 50	498	570
USB Token initial setup fee Level 100 The first edition will only be issued after training and is not included in the fees for the training. A Dongle order without training is not possible.	1.900	2.160
Annual usage fee USB-Token	180	210
Loss of USB-Token	New purchase	New purchase
TPEM plant update (does not include costs for technician)	1.500	1.700

All aforementioned prices do not include value added tax.

Notes on registration

To register participants for Training Center Mannheim events, please use the form printouts sent via email in the offer. This is necessary because the registration received by us is processed directly by computer. The registration form consists of one page with the details of the customer and the desired seminar, as well as the details of the participant(s).

Fill out the form sections completely and send them **signed** to the e-mail address given on the top of the form.

Please note that applications which do not correspond to the form given in the form and incomplete applications cannot be accepted and will therefore not be considered.