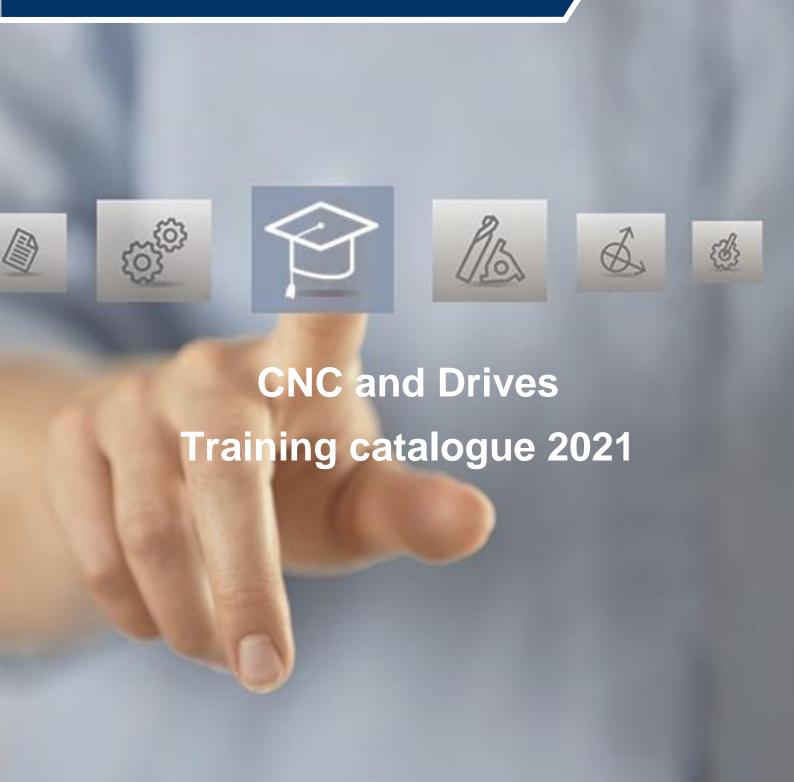
CNC Power Engineering Always on the move







Who besides you has the best expertise in your area of business?

The answer is obvious and quite simple: you are the expert in your field. Similarly, no one other than NUM could claim to have the deepest expertise of our extended range of drives and CNCs. After all, this has been our business for fifty years. This is why we are your number one partner for the training of your teams.

Whether you are a User, an OEM, a Maintenance specialist or a System builder, NUM has in its catalog all kind of training sessions dedicated to your applications and this for all generation of NUM products making parts on today machines.

Of course each customer has its own requirements, each machine and each application has its own specificities, and this is why we can also offer customized training sessions focused on your particular needs.

As a provider of CNC High End Applications, we have organized our training sessions by features and level of knowledge required, in order to help you to get all the data you need and only the data you need to be the most efficient. These sessions are conducted by training specialists and applications engineers so you can be assured that you will always get the most accurate and professional answers, whatever your question or concern might be. These sessions will give a chance to develop a durable relationship between our companies to further develop cooperation for the full benefit of all.



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Training with NUM: your advantages

- Technical data are up to date
- Should you need a specific function, you will get in depth information
- Partnership development
- You will be in touch with the experts in every domain of NUM activity
- Whatever your area of expertise might be (Maintenance, Service, Programming, Setup...), you will find the courses you need
- Full range of products, and software in one location

Training Centers

All NUM technical centers are equipped to provide training. These sessions will either take place in our premises or in your facility.



Some training facilities





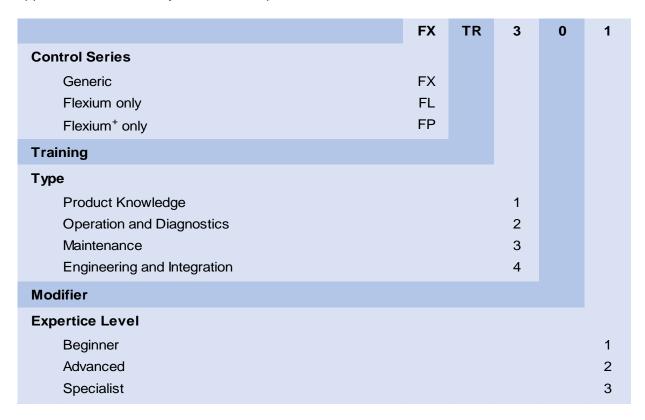






Training Courses

The different training modules are linked in a way to provide a logical path for mastering our application solutions in your area of expertise.



Generic Training Sessions

FXTR 101	Flexium system description
FXTR 102	Flexium and Safety
FXTR 201	Operation and basic maintenance
FXTR 202	Advanced part programming
FXTR 213	Flexium 3D
FXTR 223	Dynamic operators in C
FXTR 233	High speed cutting – 5 axes functions
FXTR 301	Flexium system maintenance
FXTR 401	Flexium system initial setup
FXTR 423	NUMDrive C on CANOpen
FXTR 433	Extended NCK Access (ENA)
FXTR 443	Flexium HMI personalization
FXTR 453	Communication with Flexium



Flexium-Specific Training Sessions

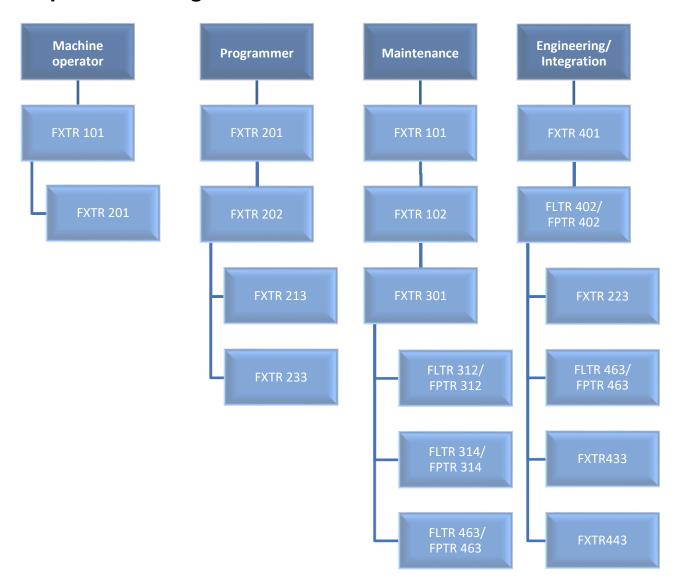
FLTR 312	Flexium advanced maintenance
FLTR 314	NUMDrive C advanced maintenance
FLTR 402	Flexium system advanced setup
FLTR 463	Safety including SAM

Flexium+-Specific Training Sessions

FPTR 312	Flexium ⁺ system advanced maintenance
FPTR 314	NUMDrive X advanced maintenance
FPTR 402	Flexium ⁺ system advanced setup
FPTR 463	Safety including NUM-SAMX



Proposed Training Paths





Your Training Contacts

China:

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Taiwan and rest of Asia:

Wu Johnny

Phone: +886 4 2316 9600

Fax: +886 4 2316 9700

E-mail: johnny.wu@num.com

For other countries, please contact your local sales representative or NUM Switzerland (sales.ch@num.com).



Training Organization

Quotation

Offers can be asked at your training contacts (see section 'Your Training Contacts').

Date and time table

Training dates and time tables will be part of a quotation.

Journey

Your local sales representative of NUM will provide you with journey information.

Hotels

Your local sales representative of NUM can recommend you hotels near to the training places.



Flexium system description

Your area of interest	Prerequisite
General knowledge	None
Objectives	Supports
 Understanding the Flexium range structure (CNCs and Drives) 	Training materials Individual componentsSimulator
 Understanding the main functions 	
✓ Ability to define a configuration with the Flexium catalogue	DeliveriesCourse presentation (printed and .pdf on CD)Flexium catalogue (on CD)
Training Content	
Flexium CNC presentation o The different models of CNCs o Hardware structure – Software functions	NUMDrive X presentation Hardware structureDrives functions and performancesAxes and spindle motors
The panels O PC Panels Machine panels	Tools O PLC programming O Web tools
The PLCStructureProgramming languagesIOs	Applications o From the single unit CNC to the multi CNC - multi panels configurations
NUMDrive C presentation Hardware structureDrives functions and performancesAxes and spindle motors	Questions and answers (1/2 hour)
Duration	Date / Costs
1 day	Please consult your local training contact



Flexium and Safety

Your area of interest	Prerequisite
General knowledge	None
Objectives	Supports
✓ Understanding the Flexium and Flexium ⁺ safety concepts	Training materials Individual componentsSimulator
 Understanding the various safety features 	Deliveries
 Ability to define the components and development required for a particular configuration 	 Course presentation (printed and .pdf on CD) Flexium catalogue (on CD)
Training Content	
Safety: What is it? Safety PLCs Safe motions Safety level	Safety and Motions SAM, STO and NUMDrive CSAMX, STOX and NUMDrive X
General on EtherCAT and FSoE	Questions and answers (1/2 hour)
The Safe PLCStructureProgramming languagesI/Os	
Duration	Date / Costs
1 day	Please consult your local training contact



Operation and basic maintenance

Your area of interest	Prerequisite
Machine operator – 1 st level maintenance	Knowledge of NUM products or FXTR 101
Objectives	Supports
 Ability to run a machine equipped with Flexium system Understanding and adjusting the coordinate systems and tools offsets Understanding operators message and status indicators to perform a first level maintenance 	 Training materials Individual components Simulator Deliveries Course presentation (printed and .pdf on CD) Programming manual (CD)
Training Content	
Operation Using the HMI Modes of operation ISO concepts (interpolation – feed rate – tools offsets – main canned cycles) Coordinate systems – programmable axes Work preparation, tools offsets, origin presets Basic of parametric programming Maintenance Status indicators Operators messages LED indications Backup of essential data Adding a system option	Tools Web tools Flexium license loader Questions and answers (2 hours)
Duration	Date / Costs
2½ days	Please consult your local training contact



Advanced part programming

FXTR 202

Your area of interest

Advanced part programming – custom macros – special functions for OEM

Prerequisite

Level FXTR 201

Objectives

- Mastering the advanced ISO functions of the system
- Ability to create a custom macro (tool changer – milling head exchange – probing etc.)

Supports

Training materials

- Individual components
- o Simulator

Deliveries

- Course presentation (printed and .pdf on CD)
- Programming and advanced programming manual (CD)

Training Content

Advanced ISO functions

- Polar programming
- Probing management
- Pocket cycles
- o Complements on parametric programming
 - Detailed information on E parameters
 - Relation with the outside via the PLC
- Structured programming
- Dynamic operators
- Customized G codes

Exercises

Questions and answers

Date / Costs

2½ days

Duration

Please consult your local training contact



Flexium 3D FXTR 213

Your area of interest	Prerequisite
Machine operation - Programming	Knowledge of NUM products or FXTR 201
Objectives	Supports
 ✓ Using Flexium 3D to validate a part program ✓ Interacting with Flexium HMI to correct possible programming faults ✓ Optional : Customizing Flexium 3D for machine simulation 	Training materials Simulator Deliveries Course presentation (printed and .pdf on CD)
Training Content	
Flexium 3D presentation Principle of operationThe different screens	
Running Flexium 3D o Program configuration o Defining the blank and the tools o Off line and On line simulation	
Exercises	
Optional Designing a machine model	
Questions and answers (2 hours)	
Duration	Date / Costs
1 day + 1 day optional	Please consult your local training contact



Dynamic operators in C

Your area of interest	Prerequisite
General knowledge	FXTR 202 and C language
Objectives	Supports
✓ Develop an application using dynamic operators in C	Training materials Individual componentsSimulator Deliveries Course presentation (printed and .pdf on CD) Flexium catalogue (on CD)
Training Content	
o Principle of dynamic operators	
 Short example using classic dynamic operators 	
Review list of parameters	
 The compiler 	
 Examples 	
o Trace and debug	
Duration	Date / Costs
1 day	Please consult your local training contact



High Speed Cutting – 5 axes functions

Your area of interest	Prerequisite
General knowledge	FXTR 202 and FXTR 401
Objectives	Supports
✓ Mastering 5 axes machining functions	Training materials
✓ RTCP (Rotating Tool Centre Point)	Individual componentsSimulator
✓ Inclined plane	Deliveries
✓ High speed cutting	Course presentation (printed and .pdf on CD)Flexium catalogue (on CD)
Training Content	
 NC 5 axes functions 	 Axes adjustments
o RTCP and inclined plane parameterization	 Flexium tools instruments
 Application 	o Practical case
 High speed machining functions 	Questions and anguers (1/2 hour)
 Speed and acceleration controls 	Questions and answers (1/2 hour)
 Optimization of parameters 	
Duration	Date / Costs
2 days	Please consult your local training contact



Flexium system maintenance

Your area of interest	Prerequisite
Maintenance	Level FXTR 101
Objectives	Supports
✓ Ability to detect and replace defective components in a short time	Training materials o Simulator
✓ Predictive maintenance	Deliveries o Course presentation (printed and .pdf on CD)
Training Content	
Flexium system maintenance	
 System structure 	
 Components 	
System startupDiagnostics	
DiagnosticsSoftware updates	
Service tool	
o Safety	
o Part replacement	
Drives maintenance	
 Product knowledge 	
 Drives exchange procedure 	
Questions and answers (1 hour)	
Duration	Date / Costs
2½ days	Please consult your local training contact



Flexium system advanced maintenance

FLTR 312

Your area of interest	Prerequisite
Maintenance	Level FXTR 301
Objectives	Supports
✓ Ability to detect and replace defective components in a short time	Training materials Simulator
✓ Predictive maintenance	Deliveries o Course presentation (printed and .pdf on CD)
Training Content	
Flexium system maintenance	NUMDrive C advanced maintenance
 Detailing the product structure 	 Detailed analysis
Exchange zone	 Drives instruments
Troubleshooting with Flexium HMIFlexium Tools	 Drives exchange procedure
 Parameters modification 	 Safety application maintenance
 Debugging with the PLC 	5 5 5 FF
 PLC program adjustments 	
 Backup and restore 	Questions and answers (1 hour)
Duration	Date / Costs
3 days	Please consult your local training contact



Flexium⁺ system advanced maintenance

FPTR 312

Your area of interest	Prerequisite
Maintenance	Level FXTR 301
Objectives	Supports
 Ability to detect and replace defective components in a short time 	Training materials Simulator
✓ Predictive maintenance	Deliveries o Course presentation (printed and .pdf on CD)
Training Content	
Flexium+ system maintenance	NUMDrive X drives advanced maintenance
 Detailing the product structure 	 Detailed analysis
 Exchange zone 	 Drives instruments
 Troubleshooting with Flexium HMI 	 Drives exchange procedure
 Flexium Tools 	
 Parameters modification 	 Safety application maintenance
 Debugging with the PLC 	
 PLC program adjustments 	Questions and answers (1 hour)
 Backup and restore 	`
Duration	Date / Costs
3 days	Please consult your local training contact



NUMDrive C advanced maintenance

FLTR 314

Your area of interest	Prerequisite
Machine maintenance	Level FXTR 301
Objectives	Supports
 ✓ Ability to detect and replace components or adjust parameters 	Training materials o Simulator
	Deliveries o Course presentation (printed and .pdf on CD)
Training Content	
Review	
 Range description 	
 Troubleshooting with Flexium HMI 	
Components connections	
 Structure of a NUMDrive C application 	
Adjustments	
 Using Flexium Tools for diagnostic 	
Main drive parameters	
 Adjustment and control 	
Questions and answers	
Duration	Date / Costs
2½ days	Please consult your local training contact



NUMDrive X advanced maintenance

FPTR 314

Your area of interest	Prerequisite
Machine maintenance	Level FXTR 301
Objectives	Supports
✓ Ability to detect and replace components or adjust parameters	Training materials o Simulator
	Deliveries o Course presentation (printed and .pdf on CD)
Training Content	
Review	
 Range description 	
 Troubleshooting with Flexium HMI 	
Components connections	
 Structure of a NUMDrive X application 	
Adjustments	
 Using Flexium Tools for diagnostic 	
 Main drive parameters 	
 Adjustment and control 	
Questions and answers	
Duration	Date / Costs
2½ days	Please consult your local training contact



Flexium system initial setup

5 days

FXTR 401

Your area of interest	Prerequisite
Engineering and Setup	FXTR 201
Objectives	Supports
 ✓ Create a first Flexium application for a machine ✓ Control basic functions – Run two axes and a spindle 	Training materials Simulator Deliveries Course presentation (printed and .pdf on CD) Installation manual – Commissioning manual – Flexium Tools (all on CD)
Training Content	
Understanding Flexium structure	Questions and answers
Flexium Tools presentation Getting familiar with the package Languages Variables Structure of a project	
Practical exercise Creating the machine structure Integrating IOs (CANopen and Ethernet) Integrating a panel Handling modes, manual and automatic commands Operator messages Power on, security Integrating axes and spindle First level of parameterization Running a simple part program Introduction to the custom visualization	
Duration	Date / Costs

Please consult your local training contact



Flexium system advanced setup

FLTR 402

Your area of interest	Prerequisite
Engineering and Setup	FXTR 401
Objectives	Supports
✓ Commissioning a Flexium system on any kind of machine	Training materials o Simulator
	Deliveries Ourse presentation (printed and .pdf on CD) Full set of Flexium manuals – Flexium Tools Example project (all on CD)
Training Content	
Detailed analysis of exchange variables	Questions and answers
 Flexium Tools complements Project simulation and debug Application control (Tasks – automated checks) Field bus control Advanced functions (Probing – tool wear – shutdown etc.) Custom screens complements Optional functions (multi NCK – multi panels etc.) Writing custom libraries 	
Duration	Date / Costs
5 days	Please consult your local training contact



Flexium⁺ system advanced setup

FPTR 402

Your area of interest	Prerequisite
Engineering and Setup Objectives	FXTR 401 Supports
	 Deliveries Course presentation (printed and .pdf on CD) Full set of Flexium manuals – Flexium Tools – Example project (all on CD)
Training Content	
Detailed analysis of exchange variables	Questions and answers
Flexium Tools complements	
Project simulation and debug	
 Application control (Tasks – automated checks) 	
Field bus control	
 Advanced functions (Probing – tool wear – 	
shutdown etc.)	
Custom screens complements Optional functions (multi NCK multi panels)	
 Optional functions (multi NCK – multi panels etc.) 	
 Writing custom libraries 	
Duration	Date / Costs
5 days	Please consult your local training contact



NUMDrive C on CANopen

Your area of interest	Prerequisite
Engineering and Setup	F?TR 402 required
Objectives	Supports
 Control of one or more NUMDrive C over CANopen 	Training materials o Simulator
	Deliveries Ourse presentation (printed and .pdf on CD) Full set of Flexium manuals – Flexium Tools Example project (all on CD)
Training Content	
Recalls on CANopen	
NUMDrive C library o Available parameters and functions	
Application	
Parameters settingsPosition control	
Position controlVelocity control	
Questions and answers	
Duration	Date / Costs
2 days	Please consult your local training contact



Extended NCK Access (ENA)

Your area of interest	Prerequisite
Engineering and Setup	F?TR 402 required
Objectives	Supports
 Exchange of additional data between NCK and PLC 	Training materials o Simulator
	Deliveries o Course presentation (printed and .pdf on CD) o Flexium Tools – Example project
Training Content	
Structure of internal communication in Flexium systems	
ENA library O Available parameters and functions	
Application	
Reading parametersWriting parameters	
 Files management 	
Questions and answers	
Duration	Date / Costs
2 days	Please consult your local training contact



Flexium HMI personalization

Your area of interest	Prerequisite
Engineering and Setup	 FXTR 101 Windows knowledge Programming knowledge of script languages
Objectives	Supports
 Creating Flexium HMI custom pages in HTML/JavaScript 	Training materials o Simulator
	Deliveries o Course presentation (printed and .pdf on CD) o Software Development Kit access o Example (on CD)
Training Content	
Introduction in the architecture of Flexium HMI	Abstract of development tools
Explanation of the Flexium HMI components FXBrowser FXServer FXLib FXLog Structure of configuration files FXServer.ini FXUser.ini Explanation of the FXServer architecture Event handling	 Exercises related to practice using HTML and JavaScript Object instancing of the classes of the development components Using of the development components Characteristics of the array structure of event classes Programming examples Questions and answers
task management Duration	Date / Costs
3 days	Please consult your local training contact



Communication with Flexium

Your area of interest	Prerequisite
Engineering and Setup	 FXTR 101 Windows knowledge Knowledge of object oriented programming (OOP) and use of COM server
Objectives	Supports
 Using of FXServer for the communication with the different components of Flexium 	Training materials o Simulator
	 Deliveries Course presentation (printed and .pdf on CD) Software Development Kit access Programming examples in C# and C++ (on CD)
Training Content	
Introduction in the architecture of FXServer Explanation of the Flexium components (FXServer, FXLib FXLor) and configuration file.	 Exercises related to practice using C# Object referencing and instancing of the classes of the development components
(FXServer, FXLib, FXLog) and configuration file (FXServer.ini)	 Using of the development components Characteristics of the array structure of event classes
Explanation of the FXServer architecture (Event handling, task management,)	 Programming examples
	Questions and answers
Duration	Date / Costs
3 days	Please consult your local training contact



Safety including SAM

FLTR 463

Your area of interest	Prerequisite
Engineering and Setup	FXTR 102 or FLTR 402
Objectives	Supports
 ✓ Understand concept. ✓ Program and Set-Up a safety application on a Flexium system 	Training materials Simulator Deliveries Course presentation (printed and .pdf on CD) Software Development Kit access Example (on CD)
Training Content	
Hardware structure	
Safety functions	
Safety application concept	
Safe PLC programming	
Drive functions STO setup SAM setup	
Questions and answers	
Duration	Date / Costs
1 day	Please consult your local training contact



Safety including NUM-SAMX

FPTR 463

Your area of interest	Prerequisite
Engineering and Setup	FXTR 102 or FPTR 402
Objectives	Supports
✓ Understand concept.	Training materials ○ Simulator
 Program and setup a safety application on a Flexium system 	Deliveries Course presentation (printed and .pdf on CD) Software Development Kit access Example (on CD)
Training Content	
Hardware structure	
Safety functions	
Safety application concept	
Safe PLC programming	
Drive functions O NUM-STOX setup O NUM-SAMX setup	
Questions and answers	
Duration	Date / Costs
2 days	Please consult your local training contact



Individual training

Your area of interest	Prerequisite
Something around NUM controls	Depending on the training content
Objectives	Supports
✓ Will be defined with you	Training materials o Simulator
	Deliveries Course presentation (printed and .pdf on CD)Example (on CD) if available
Training Content	
Will be developed with you	
Duration	Date / Costs
To be defined	Please consult your local training contact

Individual training courses can be held at NUM locations or at the customer's site.



Booking Form

For booking of training, please send an e-mail to following address with content below:

China: jane.liu@num.com

India: info.in@num.com

Taiwan and

rest of Asia: johnny.wu@num.com

For other countries, please contact your local sales representative or NUM Switzerland (sales.ch@num.com).

E-mail content

Company name: Contact person:

Function: Phone: Address:

Your order number:

Training number: Training date: Training location:

Names of the participants: