CNC Power Engineering Always on the move









CNC, Drives, and Software Training Catalog 2024



www.num.com



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 take place either 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.

	FX	TR	3	0	1
Control Series					
Flexium ⁺ und FlexiumPro	FX				
Flexium ⁺	FL				
FlexiumPro	FP				
Training					
Туре					
Product Knowledge			1		
Operation and Diagnostics			2		
Maintenance			3		
Engineering and Integration			4		
Modifier					
Expertice Level					
Beginner					1
Advanced					2
Specialist					3

Generic Training Sessions

FXTR101	Flexium system description
FXTR102	Flexium and Safety
FXTR201	Operation and basic maintenance
FXTR202	Advanced part programming
FXTR213	Flexium 3D
FXTR223	Dynamic operators in C
FXTR233	High speed cutting – 5-axis functions
FXTR301	Flexium system maintenance
FXTR433	Extended NCK Access (ENA)
FXTR463	Safety including NUM-SAMX



Flexium⁺ Specific Training Sessions

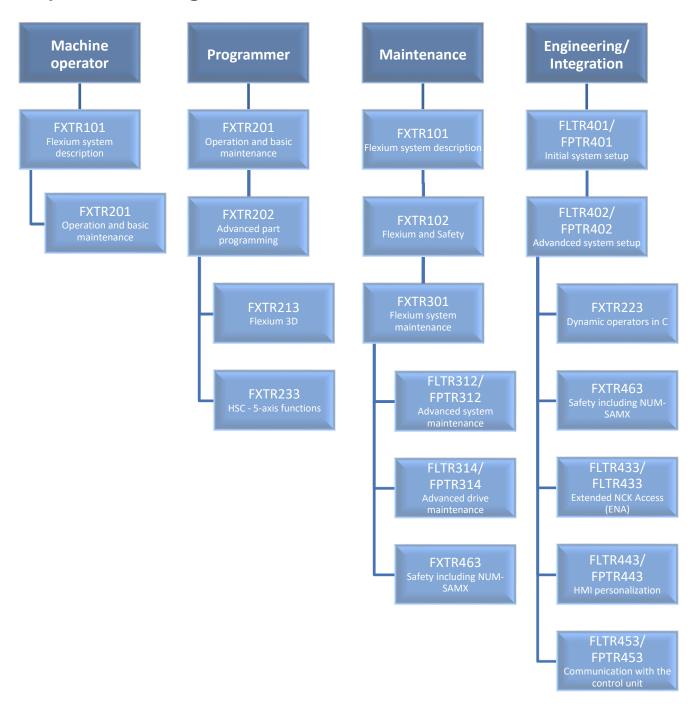
FLTR312	Flexium ⁺ system advanced maintenance
FLTR314	NUMDrive X advanced maintenance
FLTR401	Flexium ⁺ system initial setup
FLTR402	Flexium ⁺ system advanced setup
FLTR 443	Flexium ⁺ HMI personalization
FLTR 453	Communication with Flexium ⁺

FlexiumPro Specific Training Sessions

FPTR 312	FlexiumPro system advanced maintenance
FPTR 314	NUM DrivePro advanced maintenance
FPTR 401	FlexiumPro system initial setup
FPTR 402	FlexiumPro system advanced setup
FPTR 443	FlexiumPro HMI personalization
FPTR 453	Communication with FlexiumPro



Proposed Training Paths





Your Training Contacts

China:

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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 timetable

Training dates and timetables 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 components Simulator
 Understanding the main functions 	
-	Deliveries
 Ability to define a configuration with the Flexium catalogue 	 Course presentation (on memory stick) Flexium catalogue (on memory stick)
Training Content	
Flexium CNC presentation	NUM DrivePro presentation
 The different models of CNCs 	 Hardware structure
 Hardware structure – Software functions 	Drives functions and performancesAxis and spindle motors
The panels	- 1
 PC Panels Machine panels 	Tools ○ PLC programming
	 Web tools
The PLC	
o Structure	Applications
Programming languagesIOs	 From the single unit CNC to the multi CNC - multi panels configurations
 NUMDrive X presentation Hardware structure Drives functions and performances Axis and spindle motors 	Questions and answers (1/2 hour)

Duration

1 day

Date / Costs

Flexium and Safety



Your area of interest	Prerequisite
General knowledge	None
Objectives	Supports
 Understanding the Flexium safety concepts Understanding the various safety features 	Training materials Individual components Simulator
 Ability to define the components and development required for a particular configuration 	 Deliveries Course presentation (on memory stick) Flexium catalogue (on memory stick)
Training Content	
Safety: What is it? Safety PLCs Safe motions Safety level 	Safety and Motions SAMX, STOX and NUMDrive X or NUM DrivePro
General on EtherCAT and FSoE	Questions and answers (1/2 hour)
 The Safe PLC Structure Programming languages I/Os 	
Duration	Date / Costs

1 day

Operation and basic maintenance



Your area of interest

Machine operator – 1st level maintenance

Objectives

- 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 Content

Operation

- o Using the HMI
- Modes of operation
- ISO concepts (interpolation feedrate tools offsets main canned cycles)
- Coordinate systems programmable axis
- 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

Duration

3 days

Prerequisite

Knowledge of NUM products or FXTR101

Supports

- Training materials
- o Individual components
- Simulator

Deliveries

- Course presentation (on memory stick)
- Programming manual (on memory stick)
- Tools
- Web tools
- Flexium license loader

Questions and answers (2 hours)

Date / Costs

Advanced part programming



Your area of interest	Prerequisite
Advanced part programming – custom macros – special functions for OEM	FXTR201
Objectives	Supports
 Mastering the advanced ISO functions of the system 	Training materials Individual components Simulator
 Ability to create a custom macro (tool changer – milling head exchange – probing etc.) 	 Deliveries Course presentation (on memory stick) Programming and advanced programming manual (on memory stick)
Training Content	
Advanced ISO functions	Questions and answers
 Polar programming Probing management 	
 Probing management Pocket cycles 	
 Complements on parametric programming Detailed information on E parameters 	
 Relation with the outside via the PLC 	
Structured programmingDynamic operators	

• Customized G codes

Exercises

Duration

4 days

Date / Costs

Flexium 3D



Your area of interest	Prerequisite
Machine operation - Programming	Knowledge of NUM products or FXTR201
Objectives	Supports
 Using Flexium 3D to simulate and validate a part program 	Training materials o Simulator
 Interacting with Flexium HMI to correct possible programming faults 	Deliveries $_{\odot}$ Course presentation (on memory stick)
 Optional : Customizing Flexium 3D for machine simulation 	
Training Content	
Flexium 3D presentationPrinciple of operationThe different screens	Questions and answers (2 hours)
 Running Flexium 3D Program configuration Defining the blank and the tools Off line and On line simulation 	
Exercises	
Optional o Designing a machine model	
Duration	Date / Costs

1 day + 1 day optional

Dynamic operators in C



Your area of interest

Customized CNC extensions

Objectives

 Develop an application using dynamic operators in C

Prerequisite

FXTR202 and C language

Supports

Training materials

- o Individual components
- o Simulator

Deliveries

- Course presentation (on memory stick)
- Flexium catalogue (on memory stick)

Training Content

- o Principle of dynamic operators
- Short example using classic dynamic operators
- o Review list of parameters
- o The compiler
- o Examples
- Trace and debug

Duration

1 day

Date / Costs

High Speed Cutting – 5-axis functions



Your area of interest	Prerequisite
5-axis parts machining	FXTR202
Objectives	Supports
✓ Mastering 5-axis machining functions	Training materials
✓ RTCP (Rotating Tool Centre Point)	 Individual components Simulator
 ✓ Inclined plane 	Deliveries
✓ High speed cutting	 Course presentation (on memory stick) Flexium catalogue (on memory stick)
Training Content	
 NC 5-axis functions 	 Axis adjustments
\circ RTCP and inclined plane parameterization	 Flexium Tools instruments
 Application 	 Practical case
 High speed machining functions 	Questions and answers (1/2 hours)
 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



FXTR102
Supports
Training materials Simulator
DeliveriesCourse presentation (on memory stick)
Questions and answers (1 hour)

• Drives exchange procedure

Duration

3 days

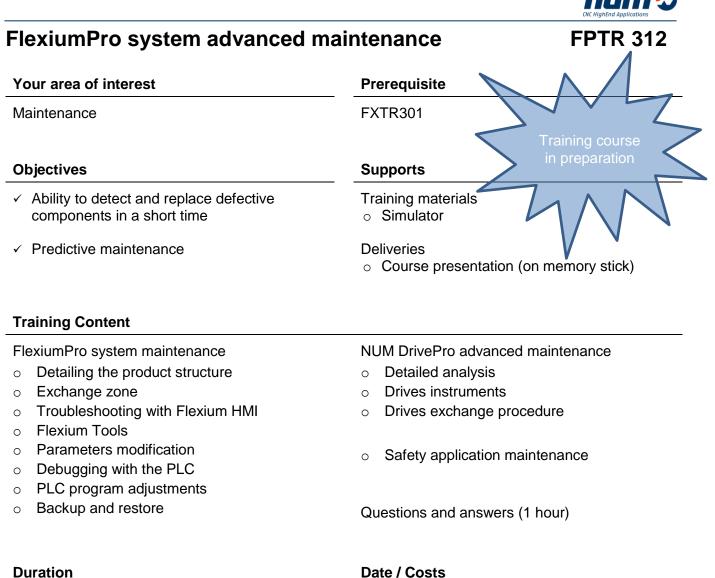
Date / Costs

Flexium⁺ system advanced maintenance

	D
FLTR312	

Your area of interest	Prerequisite
Maintenance	FXTR102
Objectives	Supports
 Ability to detect and replace defective components in a short time 	Training materials Simulator
✓ Predictive maintenance	Deliveries Course presentation (on memory stick)
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 	
 Backup and restore 	Questions and answers (1 hour)
Duration	Date / Costs

3 days



3 days

Date / Costs

NUMDrive X advanced maintenance

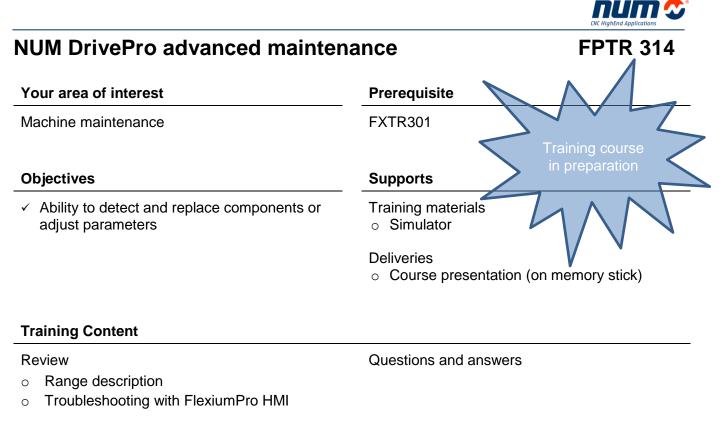


Your area of interest	Prerequisite
Machine maintenance	FXTR301
Objectives	Supports
 Ability to detect and replace components or adjust parameters 	Training materials o Simulator
	Deliveries Course presentation (on memory stick)
Training Content	
Review	Questions and answers
• Range description	
 Troubleshooting with Flexium HMI 	
Components connections	
 Structure of a NUMDrive X application 	
Adjustments	
 Using Flexium Tools for diagnostic 	
 Main drive parameters 	
 Adjustment and control 	

Duration

3 days

Date / Costs



Components connections

o Structure of a NUM DrivePro application

Adjustments

- o Using FlexiumPro Tools for diagnostic
- o Main drive parameters
- o Adjustment and control

Duration

3 days

Date / Costs

Flexium⁺ system initial setup

Your area of interest

Engineering and Setup

Objectives

- Create a first Flexium⁺ application for a simple machine
- Control basic functions Run two axes and a spindle

Prerequisite

FXTR201

Supports

Training materials

 \circ Simulator

Deliveries

- Course presentation (on memory stick)
- Installation manual Commissioning manual – Flexium Tools (all on memory stick)

Training Content

Understanding Flexium⁺ structure

- Flexium Tools presentation
- Getting familiar with the package
- o Languages
- o Variables
- o Structure of a project

Practical exercise

- o Creating the control structure
- o Integrating IOs (CANopen and Ethernet)
- o Integrating a panel
- Handling modes, manual and automatic commands
- o Operator messages
- o Power on, security
- o Integrating axes and spindles
- First level of parameterization
- o Running a simple part program
- o Introduction to the custom visualization

Duration

5 days

Questions and answers

Please consult your local training contact

Date / Costs



FLTR401

Flexium⁺ system advanced setup



Your area of interest	Prerequisite
Engineering and Setup	FLTR 401
Objectives	Supports
 Commissioning a Flexium system on any kind of machine 	Training materials Simulator
	 Deliveries Course presentation (on memory stick) Full set of Flexium manuals – Flexium Tools – Example project (all on memory stick)
Training Content	
Detailed analysis of exchange variables	Questions and answers
Flexium Tools complements	
 Project simulation and debug Applies the second of the second secon	
 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

5 days

Date / Costs

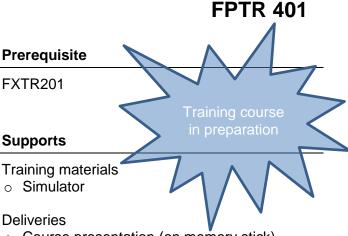
FlexiumPro system initial setup

Your area of interest

Engineering and Setup

Objectives

- Create a first FlexiumPro application for a simple machine
- Control basic functions Run two axes and a spindle



- Course presentation (on memory stick)
- Installation manual Commissioning manual – Flexium Tools (all on memory stick)

Training Content

Understanding FlexiumPro structure

- FlexiumPro Tools presentation
- Getting familiar with the package
- o Languages
- o Variables
- o Structure of a project

Practical exercise

- Creating the control structure
- Integrating IOs (CANopen and Ethernet)
- o Integrating a panel
- Handling modes, manual and automatic commands
- o Operator messages
- o Power on, security
- o Integrating axes and spindle
- First level of parameterization
- Running a simple part program
- o Introduction to the custom visualization

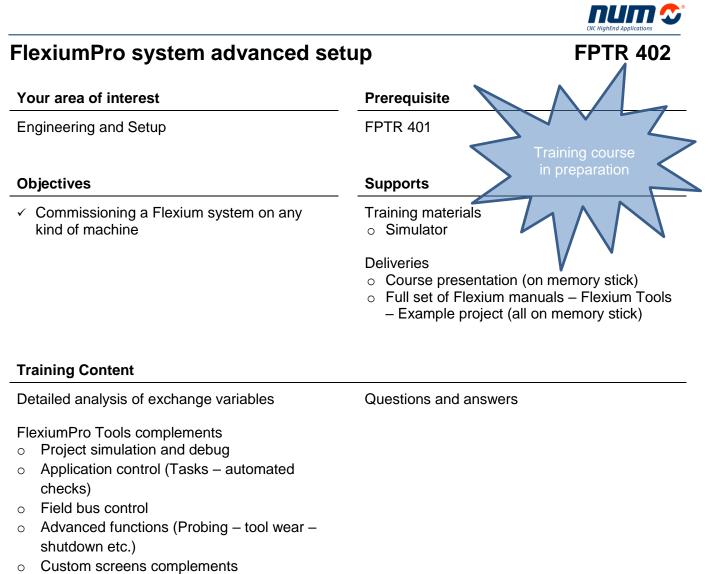
Duration

5 days

Questions and answers

Date / Costs





- Optional functions (multi NCK multi panels etc.)
- Writing custom libraries

Duration

5 days

Date / Costs

Extended NCK Access (ENA)



Your area of interest	Prerequisite
Engineering and Setup	FLTR402 or FXTR402
Objectives	Supports
 Exchange of additional data between NCK and PLC 	Training materials Simulator
	 Deliveries Course presentation (on memory stick) Flexium Tools – Example project
Training Content	
Structure of internal communication in Flexium systems	Questions and answers
ENA library o Available parameters and functions	
Application Reading parameters 	
 Writing parameters Files management 	
Duration	Date / Costs

2 days

Flexium⁺ HMI personalization



Your area of interest	Prerequisite
Engineering and Setup	 FXTR101 Windows knowledge Programming knowledge of script languages
Objectives	Supports
 Creating Flexium HMI custom pages in HTML/JavaScript 	Training materials o Simulator
	 Deliveries Course presentation (on memory stick) Software Development Kit access Example (on memory stick)
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 	 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
 Explanation of the FXServer architecture Event handling task management 	Questions and answers
Duration	Date / Costs

3 days

Date / Costs

Communication with Flexium⁺



Your area of interest	Prerequisite
Engineering and Setup	 FXTR101 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⁺. This allows connections to other systems, independent HMIs, etc. to be realized. 	 Training materials Simulator Deliveries Course presentation (on memory stick) Software Development Kit access Programming examples in C# and C++ (on memory stick)
Training Content	
Introduction in the architecture of FXServer Explanation of the Flexium ⁺ components • FXBrowser • FXServer • FXLib • FXLog	 Exercises related to practice using C# Object referencing and instancing of the classes of the development components Using of the development components Characteristics of the array structure of event classes Programming examples
Explanation of the FXServer • Eventhandling • Task-Management ···	Questions and answers

Duration

2 days

Date / Costs

FlexiumPro HMI personalization



Your area of interest	Prerequisite
Engineering and Setup	 FXTR101 Windows knowledge Programming knowledge of C#
Objectives	Supports
 Creating FlexiumPro HMI custom pages in C# 	 Training materials Simulator Training course in preparation
	Deliveries Course presentation (on memory stick) Software Development Kit access Example (on memory stick)
Training Content	
Introduction in the architecture of FlexiumPro HMI	Abstract of development tools
Explanation of the FlexiumPro HMI architecture	Exercises related to practice using C# Programming examples
Structure of configuration files	Questions and answers
Duration	Date / Costs
3 days	Please consult your local training contact

Communication with FlexiumPro



Your area of interest	Prerequisite
Engineering and Setup	 FXTR101 Windows knowledge Programming knowledge of C#
Objectives	Supports
 Use of the FlexiumPro SDK for communication with the various FlexiumPro components. This allows connections to other systems, independent HMIs, etc. to be realized. 	 Training materials Simulator Deliveries Course presentation conmemory stick) Software Development Kit access Programming examples in C# and C++ (on memory stick)
Training Content	
Introduction in the architecture of FlexiumPro SDK	Exercises related to practice using C# Programming examples
	Questions and answers
Duration	Date / Costs
2 days	Please consult your local training contact

Safety including NUM-SAMX



Your area of interest

Engineering and Setup

Objectives

- ✓ Understand concept.
- Program and setup a safety application on a Flexium⁺ or FlexiumPro system

Prerequisite

FXTR102 or FPTR 402

Supports

Training materials

 \circ Simulator

Deliveries

- Course presentation (on memory stick)
- Software Development Kit access
- Example (on memory stick)

Training Content

Hardware structure

Safety functions

Safety application concept

Safe PLC programming

Drive functions

- NUM-STOX setup
- NUM-SAMX setup

Duration

2 days

Questions and answers

Date / Costs



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 (on memory stick) Example (on memory stick) 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 NL	IM 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: