



TG drives

TG motion



Universal PC Based Control System

(Product Data Sheet)

TG motion

TG Motion is universal PC based control system. The system includes single-axis, multi-axis and CNC motion functions like:



point to point
positioning



positioning to brand
(indexing)



servomotors
synchronization
(electronic gearing)



electronic
cam shift



CNC interpolation



free programming

User can create motion consists of the functions and can control mechanisms like robots, manipulators, CNC machines, packaging machines, assembly machines, etc.

Characteristics

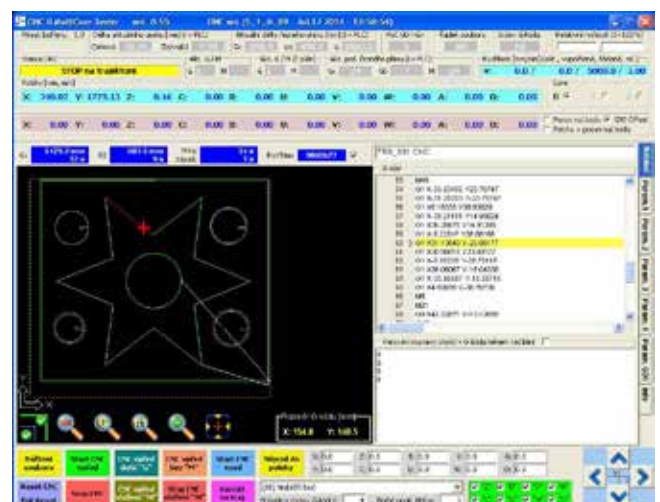
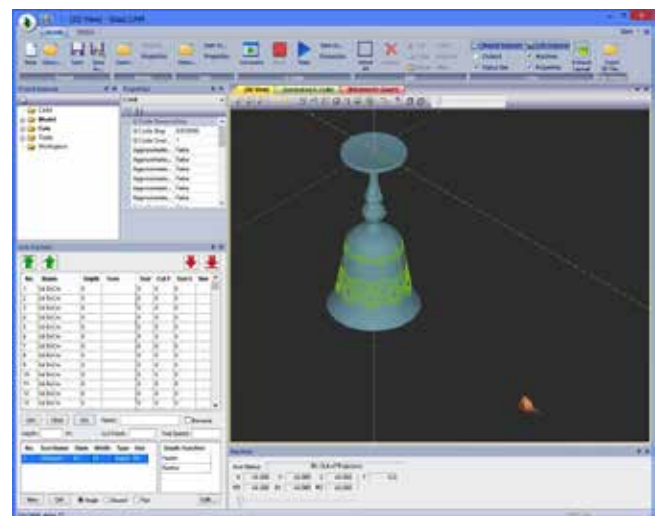
PC communicates with remote I/O and servo-controllers via EtherCAT or CAN communication interface. System computational algorithms are realized in Real Time Process which works together with OS Windows. Accuracy of the Real Time Process is in microseconds. User can use all drivers, libraries and connections working under OS Windows.

TG Motion control system can work together with OS Windows:

- ◆ Windows Embedded Standard 2009
- ◆ Windows 7 PRO / 32 or 64 bit
- ◆ Windows 8.1 / 64 bit

Control Observer is the tool for testing user's programs, monitoring parameters, creating CAM profiles etc. Control observer includes oscilloscope with up to 32 channels.

Thanks to offer and continual development of personal computers is ensured the hardware development automatically.



Software

TG Motion control system consists of two basic software modules:
Virtual PLC module and **CNC module**.

Virtual PLC module

Virtual PLC is basic control module, which controls all logical function of a machine, servo-controllers and CNC module. Programming of the PLC is under general development environment (Visual Studio or Delphi Studio) in program language C, C++, Pascal, Basic, etc.

Virtual PLC accesses to memory space, where are shared registers of inputs and outputs and control registers of the servo-controllers and CNC module. This memory can be shared by other Windows programs.

PLC module can control other devices via EtherCat or CAN bus by SDO objects.

It is necessary to write a PC panel program – a Win32 application, which allows control, diagnostics and service of the machine.

Parameters of the Virtual PLC	
Cycle time	100 μ s
Numbers of the parallel programs	5
Numbers of the timers (1 ms discrete)	128
Process priority	yes
Program called by interrupt	yes
Capture (positions, inputs)	yes
Memory of the internal PLC (shared memory)	524 kB
Typical delay – input to output	700 μ s

CNC module

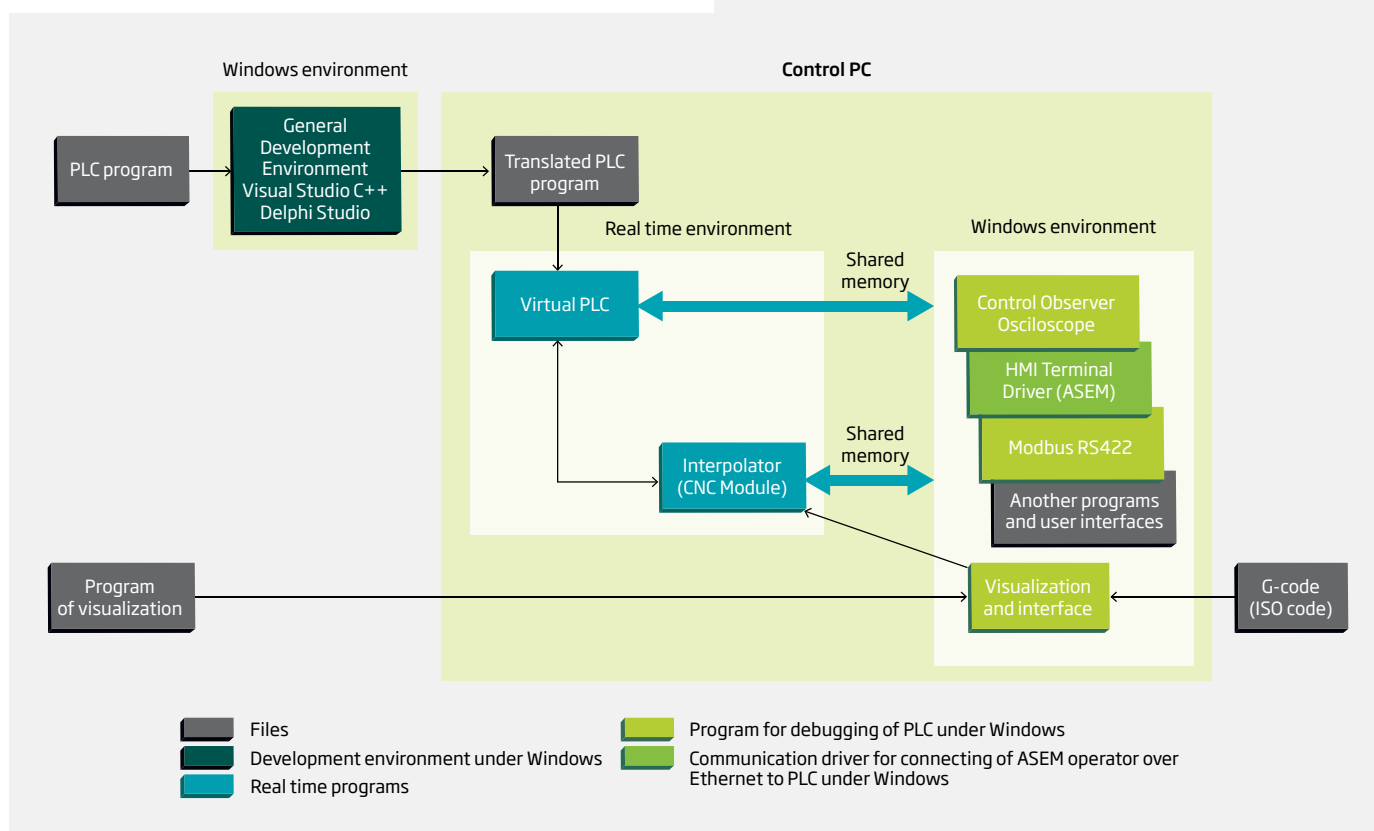
CNC module ensures Real Time transformation of the end point position to servo axis position according to the required trajectory. Parameters of a mechanism are defined in data CNC file. CNC module can make transformation of up to 3 CNC kernels – so it is possible to control up to 3 independent mechanisms. Each CNC kernel could have up to 10 interpolated servodrives.

User can transform data from CNC module to any coordinate system and back or can create algorithms of axis dependence. These algorithms can be created in a math library. Calculations of the library are realized in the same cycle as the calculation of interpolator.

Trajectories are possible to download from a G-code or from a profile generator. Thanks to the fact the algorithm of transformation is Real Time (100 μ s) it is possible to change position profile even if the mechanism is moving. Final position can be changed according to a sensor or camera status.

CNC kernel (interpolator) supports the download of G-codes (ISO codes) and executes the instructions that reads from the ring buffer. Trajectory of the endpoint or movements of individual drives are created in the CAM program outside TG Motion control system. In addition, it is possible to create your own application under Windows that would generate G-codes, and feed by them buffer of the interpolator.

TG motion Schematic diagram



Hardware

Hardware of the TG Motion can be very easily modified according to the required counting power, numbers of the servo-axis and I/O terminals.

Industrial computer

There are minimum requirements on PC – processor frequency 650 MHz, 1 GB RAM memory. Hard drive could be Industrial CF (Compact Flash), SSD (Solid State disk) or HDD (Hard disk).

Communication Interface

EtherCAT Master is part of the system TG Motion, which uses one of the two Ethernet ports of computer. EtherCAT interface is intended to communicate with the servoamplifier and I/O modules. The second Ethernet port is used for communication over the network.

For some applications it is necessary CAN bus communication, that is made using a CAN card into the PCI or Mini PCI slot. The CAN interface is used to communicate with servoamplifiers or with the I/O modules, or with other external device (frequency converters etc.). The card may have one or two CAN outputs.

Servoamplifiers

The following servoamplifiers can be connected to TG Motion:

- ◆ AKD
- ◆ TGA 300
- ◆ TGA-24, TGA-48
- ◆ S700
- ◆ Servostar 400/600
- ◆ TG Power
- ◆ TGZ

Remote I/O terminals

Remote I/O terminals are connected to TG Motion through interface EtherCat or CAN BUS. Input and output modules TG_I/O have the following specification:

TG_I/O_48_40_4_4-ETH

48 digital inputs, 40 digital outputs, 4 analog inputs, 4 analog outputs

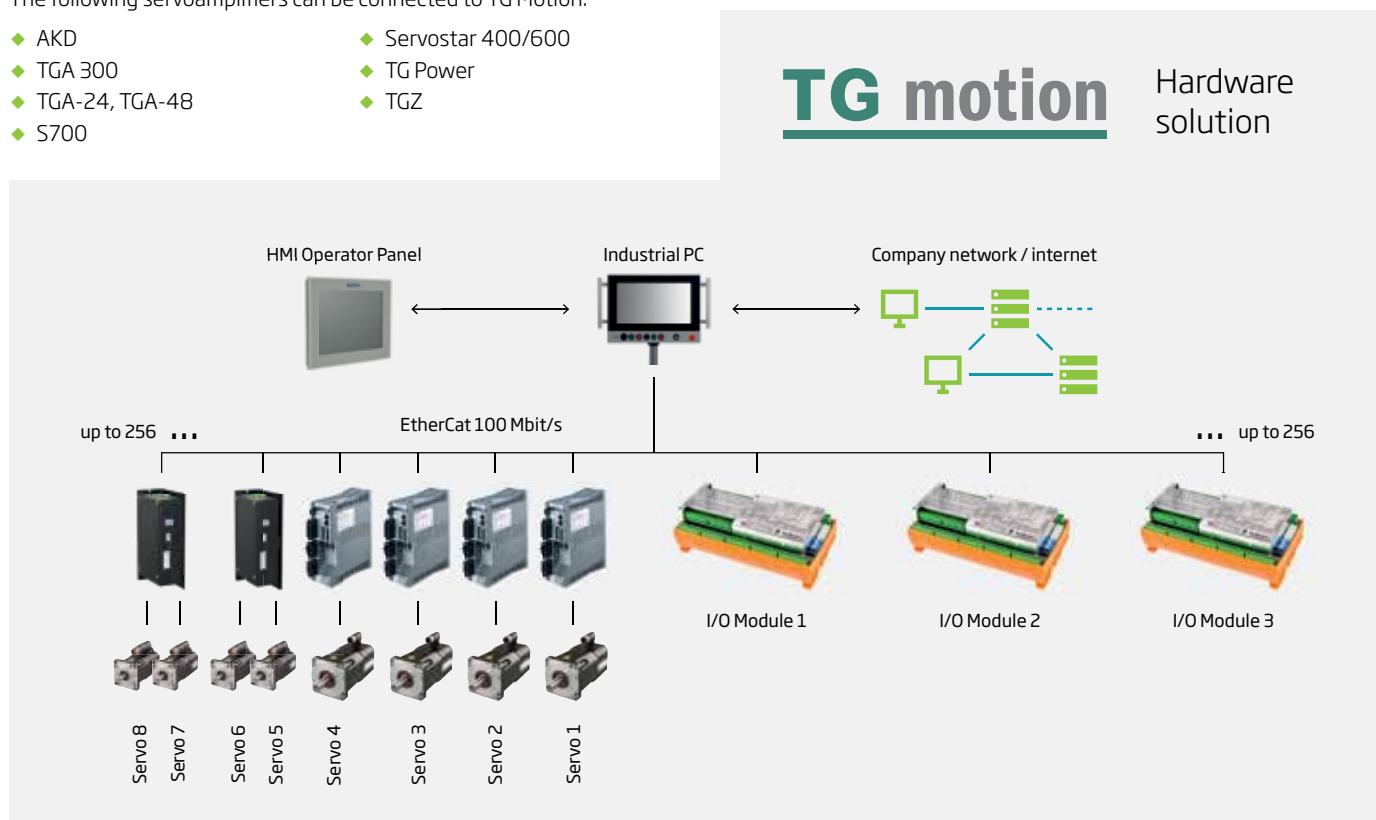
TG_I/O_40_24-ETH

40 digital inputs, 24 digital outputs,

TG_I/O_40_24_4_4-CAN

40 digital inputs, 24 digital outputs, 4 analog inputs, 4 analog outputs

TG Motion allows connection of other I/O modules from other manufacturers. Except standard I/O modules is possible to connect also special modules – for example: communication converters, tenzometric inputs, valve modules, etc.



Servomotors ◆ Servoamplifiers ◆ Gearboxes ◆ Control systems