



## Motivation

The great advantage is to be able to monitor the function and status of the machine remotely from practically anywhere in the world. Our remote diagnostics system makes this possible.

## Description

The technical means of our service is the possibility of remote connection via internet connection to the customer's machine (we have the appropriate software in our company and after enabling the service on the customer's side we are able to connect to the machine remotely).

Remote diagnostics is offered for all machines from the production of TOS VARNSDORF a. s., which are equipped with the control system HEIDENHAIN TNC 640 or SINUMERIK 840D sl.

Technically, the system is designed in such a way that the customer's machine is equipped with a communication unit (a combination of Modem, Router and Switch), which after the demand of the machine operator sends a request via the Internet to connect to the service operator on the manufacturer's side (the system is equipped with security certificates and keys for creating a secure connection).

## Benefits

- Remote display of the control panel screen of the connected machine, including its remote control
- Remote control of the machine system including its internal parameters
- Remote diagnostics of drives, gauging and indication of machine inputs/outputs
- Rapid remote verification of machine faults/malfunctions - interactive transmission of machine status data
- In the case of an electronic problem, immediate remote solution
- Transfer of data to the customer's control system to support the technological use of the machine (transfer of NC programs, tool tables and zero points) and the correction of its characteristics (transfer of PLC programs and machine parameters).

# REMOTE DIAGNOSTICS

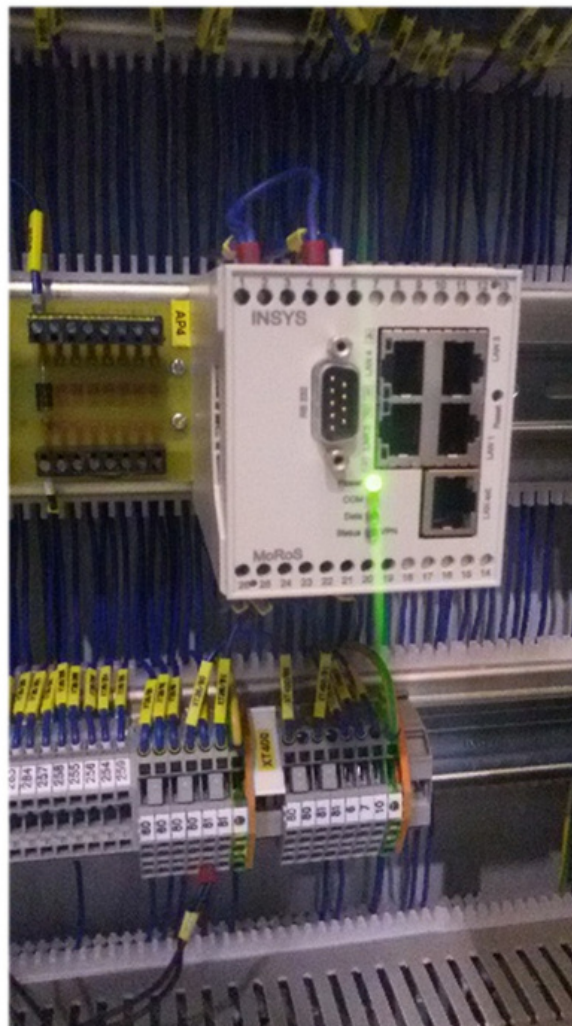
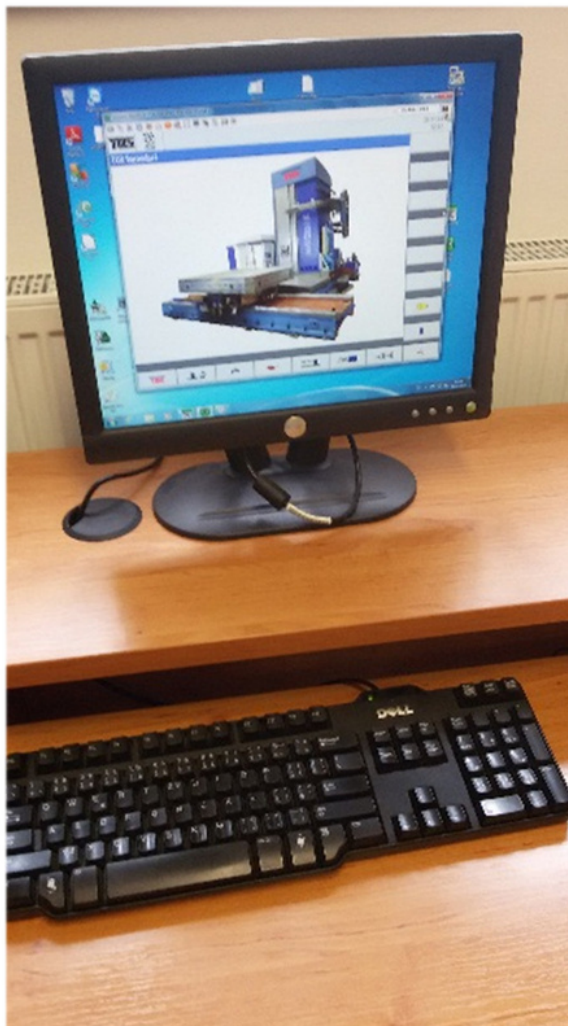


TOSwide Service allows performing remote diagnostics on machines produced by TOS VARNSDORF a.s. (JsC) equipped with a HEIDENHAIN or SIEMENS control system and a remote-diagnostics workstation with a PC (Windows 7 operating system and appropriate software). The TOSwide Service is a modern tool for increasing productivity, enabling to diagnose all machine functions (PLC), monitor the status of inputs and outputs, and check the active machining parameters.

Clarification of any malfunctioning of the machine or the system is an effective tool for speedy and successful service intervention. Therefore the TOSwide Service provides a direct service to the customer (upon request from an operator) but also serves as an auxiliary tool to the company service centre in communication with the customer.

## Basic description of TOSwide

Technical means of the service consist of a remote diagnostic workstation equipped with the appropriate software according to the control system, which is connected to the Internet and placed at the manufacturer (in case of an intra-plant modification of the TOSwide Service at the customer it is possible to use the intra-plant network of the customer). The TOSwide Service is offered for those machines produced by TOS VARNSDORF a.s. (JsC) that are fitted with the HEIDENHAIN iTNC 530, iTNC530HSCI or SINUMERIK 840D SI control systems, including later versions. On the customer side there is a MOROS module, a DIN rail mounted unit installed in the customer's switchboard (which in a compact form combines the function of a Modem, Router and Switch) and which, after a request is made by the operator, sends a request via the Internet to be connected to the TOS VARNSDORF server. After successful exchange of certificates and security keys a connection is established and the TOS VARNSDORF technician can operate the machine.



# REMOTE DIAGNOSTICS



## TOSwide options

- displaying the current screen of the connected control system and its remote control
- obtaining data from the connected control system for checking purposes
- fast problem solution (pinpointing a defect) on the tool machine remotely – interactive data transmission reporting on the state of the machine
- diagnostics of drives, measuring and indication of inputs/outputs of the machine
- Data transfer from the service network to the control system of the customer in order to support the technological use of the machine (transmission of NC programs, tool tables and machine zero points) and when the machine characteristics are modified (transmission of PLC programs, machine data).

The screenshot displays a Windows desktop environment with a remote diagnostics application window titled 'INCOPLAN'. The application window shows the following data:

**610-KONSERW: KONTROLA CIŚNIENIA I SMAROWANIA WRZECIENNIKA**

Program WPR. do pani.

RZECZ	X	-1670,484
	Y	+204,634
	Z	+519,723
	W	+0,133
	*B	+359,9998

S1 359,92

Przebieg PGM PAL LBL CYC M POS

ZADAN	X	-1670,484	W	+0,133
	Y	+204,634	*B	+8,0000
	Z	+519,723		

T: 2 ROZW-ZGR

L +0,0000 R +0,0000

DL-TAB DR-TAB

DL-PGM DR-PGM

M134

LBL

LBL REP

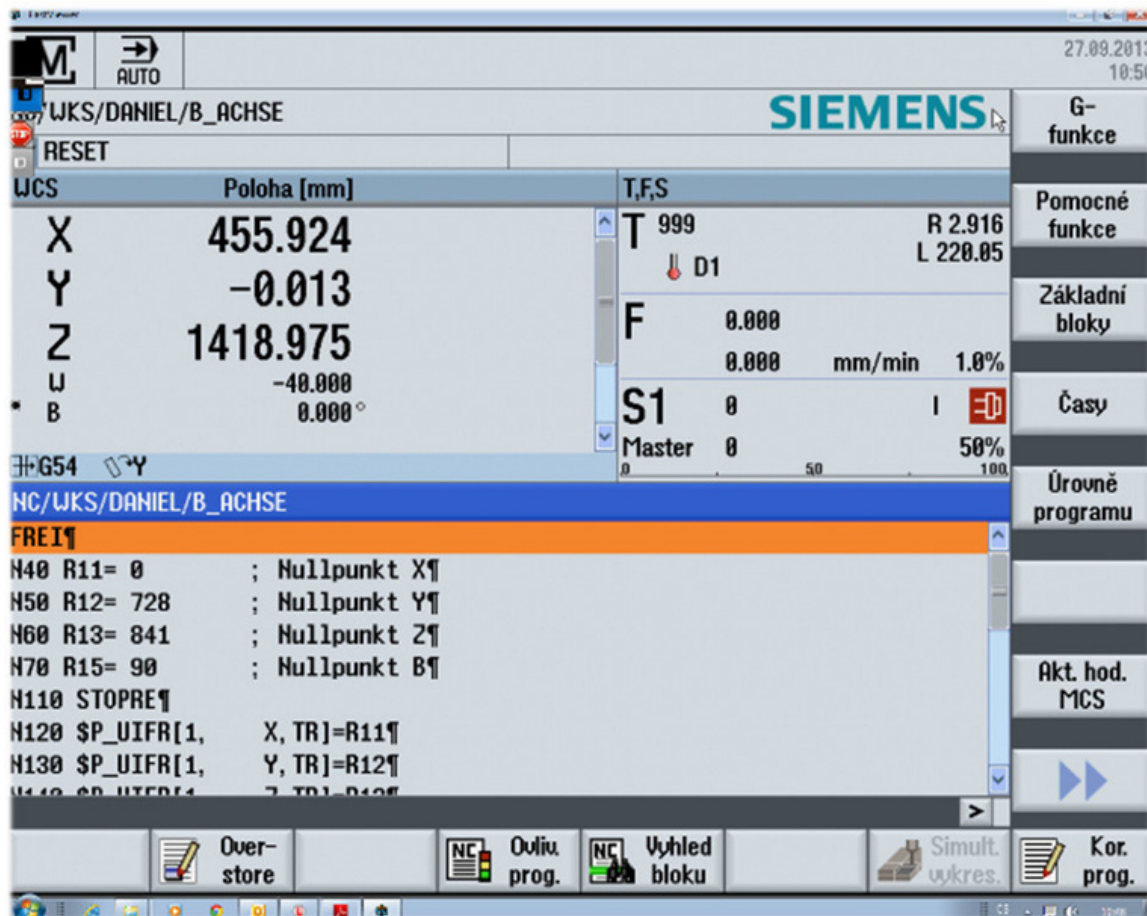
PGM CALL 00:08:18

Aktywny PGM: M41

Ps = 0% 15.09.2014 8:52 M73

OVERVERRIDE S=106% F= 73%

STATUS PRZEGLADU STATUS WSPOLRZ. POŁOZENIE NARZEDZIE POŁOZENIE WSPOLRZ. PRZELICZ.



## TOSwide Security

The requirement for communication is always initiated by the customer, not by TOS Varnsdorf a.s. (JsC) and is always an outgoing communication. The connection is secured via a Virtual Private Network (VPN). This system assumes that the user is connected to the VPN unit and thus is who it claims to be. Another assumption is that both networks are protected by firewall that enables access only to defined VPN gateways. VPN uses digital certificates to authenticate users and all communication is encrypted. In the case of longer connection the encryption algorithm will change after every hour in accordance with the factory settings. We can therefore consider it secure.

## CONDITIONS OF CONNECTIONS OF THE DEVICE

- The customer connects an Ethernet cable into the switchboard and connects its other end to the LAN socket Ext. of the MOROS unit with Internet access.
- Communication runs on UDP port 1194; it is necessary to have permission on the outbound firewall (the unit at the customer side sends a request to TOS VARNSDORF).
- Allocation of free IP address to the MOROS unit in the event that the customer will require two-way communication – i.e., to be able to send NC programs to the machine via a cable from the office as well as to perform remote diagnostics. In the event that the customer only selects remote diagnostics, the unit is set to DHCP client and receives an IP address from the server.