



5232955

### Presentation

TwidoSuite programming software is a user-friendly tool designed to help you develop projects created on Twido controllers. It provides seamless continuity for applications created using TwidoSoft.

TwidoSuite is easy-to-use and takes little or no time to learn how to use. Its primary aim is to reduce project development time significantly by simplifying all necessary interventions.

TwidoSuite is the first software tool:

- Organized according to the project development cycle. Navigation through the software is so easy that it becomes second nature.
- Offering an interface that is resolutely modern, pleasant and intuitive, so that getting started is:
  - More user-friendly
  - Faster - the simplified interface helps you find the information you need in a matter of seconds
  - More efficient, thanks to the numerous tools and tips on offer

TwidoSuite software runs with the following minimum configurations:

- Microsoft Windows® 2000, Microsoft Windows® XP (service Pack 2 recommended)
- 466 MHz Pentium type processor, hard disk with 100 Mb space available and 128 Mb of RAM
- Minimum screen resolution of 800 x 600 pixels

### Connecting a PC to the controller

There are several ways of connecting a PC to controllers during the programming, debug and maintenance phases.

#### Link via connection cables

The PC is connected to the Twido bases via:

- A USB port using the USB/RS 485 converter **TSX CUSB 485** and the 2.5 m Mini-DIN/RJ45 cable **TSX CRJMD25**
- A RS 232 serial port via the 2.5 m 9-way Mini-DIN/SUB-D multifunction cable **TSX PCX 1031**

#### Link via modem

Modems are a very practical solution avoiding the need for on-site attendance for certain maintenance operations.

The modem connected to the Twido controller must be declared in the hardware configuration. It will be initialized by the controller automatically (Hayes initialization string).

At the PC end, the TwidoSuite software will associate a special modem connection that will be memorized in the project (including the telephone number to use), see page 10012/5.

#### Ethernet network link

Thanks to its embedded Ethernet port, the Twido compact bases controller **TWD LCAE 40DRF** and **TWD LCDE 40DRF** can be connected to a PC using the Ethernet network and the Modbus TCP/IP protocol.

The TwidoPort Plug&Play interface module **499 TWD 01100** is extremely easy to use, and can be used to incorporate all Twido controllers (firmware version ≥ 3.0) into an Ethernet TCP/IP network.

#### Bluetooth wireless link

The ideal solution during the debug phase, the Bluetooth wireless link provides the convenience of total freedom of movement within a radius of 10 m around the Twido controller.

Being self-powered, the Modbus - Bluetooth adaptor **VW3 A8 114** simply has to be connected to the Twido controller. If the PC does not have Bluetooth technology, the USB - Bluetooth adaptor **VW3 A8 115** should be used.

# Twido programmable controller

## TwidoSuite programming software

### Navigation, management, description

523256



#### Instinctive, visual navigation

Navigation within TwidoSuite is intuitive and highly visual.

Presentation is optimized in such a way that selecting the development stage of the desired project makes the appropriate tools available.

The environment ensures nothing is overlooked, by suggesting the tasks to be performed throughout the project development cycle.

The workspace has been streamlined so that only that which is necessary and relevant to the current task is featured, without any superfluous information.

An area can be used to activate additional tools in a matter of seconds.

The basic functions are permanently accessible for quick and easy navigation and access to information.

#### Project management

The "Project management" function is used to:

- Create a new project with the option to enter data by means of a form and attach a photo
- Open a project from the PC (hard disk, CD-Rom, USB key, etc.)
- Review a project from a Twido controller.

There is quick access to the most recently-used projects.

#### Description of the architecture

This function is used to:

- Define the Twido hardware used in the project (controller, I/O extension, options, etc.)
- Describe the controller environment, such as, for example:
  - The HMI terminal connected
  - The devices connected to the CANopen network
  - Etc.

This hardware context for the project is essential for explaining as clearly as possible the composition of the control system managed by the Twido controller.

A highly visual "Catalog" can be used to select the appropriate product including:

- The product reference
- The product description
- A photo of the product

A graphic editor can be used to assemble the various elements easily by a simple drag & drop.

The "Parts list" tool lists all the products used and can retrieve this information in Excel format so that an order for equipment can be prepared more quickly, for example.

523257



#### Configuration

The configuration stage is used to define the elements that will be available for programming. There are three types of configuration:

- Hardware configuration, which defines, for example, the type of sensor connected to an analog extension module input or even the temperature scale to be used (°C or °F)
- Data configuration, which is used to set timer parameters and define the constants and the number of memory words to be used
- Behavior configuration, which specifies the start-up conditions for the application (automatically on controller power-up, or dependent on the state of an input), the scan mode, etc.

#### Programming

Programming is an essential step, and one which has been carefully designed to be as efficient as possible. The program can now therefore be organized into "Sections", which simplify reading and navigating through the program.

These sections can be programmed in LIST or LADDER language.

For enhanced productivity, a new Ladder Editor helps create the program in record time. Use of the "Data Browser" tool replaces the often tedious task of entering a memory address with a simple drag & drop.

#### Debugging

Often performed in difficult conditions, debugging is now much improved.

The connection task is guided step-by-step, so that all the actions performed by TwidoSuite (choice of connection, test of the connected controller, selection of the transfer performed) can be followed.

The program is then animated, allowing modifications to be made without stopping the controller (RUN).

Animation tables display the memory objects in a user-friendly way.

A mini floating display panel can be used to control actions on the controller.

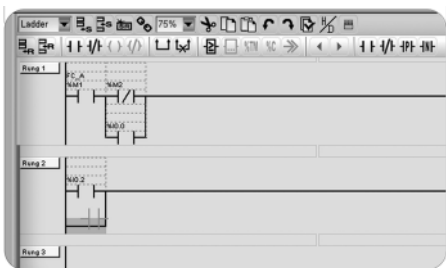
#### Documentation

Because a printed dossier of the created project is still a crucial element, it is possible to configure some project elements for printing, define the page layout to suit the user's requirements, and then launch printing.

A preview function avoids wasted print jobs.

Generating an HTML folder allows the documentation to be reviewed in Microsoft Word 2000 in order to add to it and create a maintenance manual, for example.

523259



523259



#### Macros for Modbus serial link and CANopen bus

In order to make programming easier, a system of macros simplifies writing of the program and improves understanding of the code. This system is presented according to different families of equipment - generic equipment, variable speed drives (ATV 31, ATV 61, ATV 71 and Lexium 05).

For each family, a list of macros is suggested to facilitate exchanges between the Twido programmable controller and the device connected to the Modbus serial link or the CANopen bus. These macros are in the form of configurable families to describe the network characteristics of the device involved (Modbus network or CANopen bus, slave address, etc.). The instances thus configured can be run within the program.

For each macro, symbols for objects used can be generated automatically in order to provide further assistance in terms of readability of the application. For each macro inserted in the program, TwidoSuite software automatically generates code in Instruction List language, encapsulated in a subroutine. The macro's code call line is compiled by the TwidoSuite software by calling a subroutine.

After calling up a macro, the code generated in Instruction List language can be displayed. No modifications to the content of subroutines generated in this way are allowed.

#### Counter function

The counter function allows the controller to count a large number of pulses, within one program scan cycle. The fast counters can compare the current counter value with a preset value and trigger an output when the preset value is reached. This type of counter function can be used for counting parts or events, or for measuring length or position.

The number of integrated fast counters depends on the type of base controller:

Base controller type	Compact LC●A 10/16/24 DRF	Compact LCA● 40DRF LCD● 40DRF	Modular LMDA 20D●K/20DRT LMDA 40D●K	Extreme LEDCK1
VFC counter (20 kHz)	1	2	2	—
FC counter (5 kHz)	3	4	2	1 (10 kHz)

#### Very fast counter - VFC (20 kHz)

The 32-bit fast counter (VFC) is an up/down counter with the possibility of auxiliary inputs. The counter is accessed by means of the %VFCi function block programmed using TwidoSuite. The %VFCi function block can be used to execute one of the following five functions, all with a maximum frequency of 20 kHz:

- Up/Down counter
- Up/Down counter with detection of running direction
- Single up counter
- Single down counter
- Frequency meter

The pulses to be counted may come from an incremental encoder or from two proximity sensors (up/down counting) connected to inputs I0 and I1 of Twido base controllers.

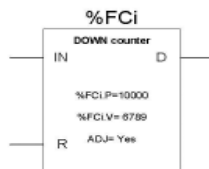
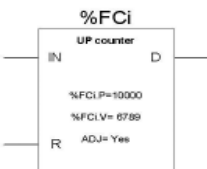
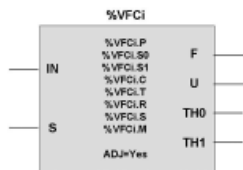
#### Fast counter - FC (5 or 10 kHz)

The 16-bit fast counter is available for up or down counting of pulses (rising edges) on the discrete inputs of Twido base controllers at a maximum frequency of 5 kHz.

The up and down counters are accessed by means of the %FCi function block programmed using TwidoSuite. Using the configuration editor, the user must select either up or down counting mode for each function block, define the initial value of the preset %FCi.P and select the attribute "adjustable" in order to be able to dynamically change the preset value %FCi.P and the current value %FCi.V. Within function block %FCi, the current value %FCi.V varies by:

- Incrementing the value 0 to the preset value %FCi.P in up counter mode
- Decrementing the preset value %FCi.P to 0 in down counter mode

(1) Requires TwidoSuite software version ≥ 1.20.



#### Position control

Twido compact (TWD LCA● 40DRF), modular and Extreme controllers offer two software positioning functions (frequency 7 kHz) (1) which can be used, for example, for controlling stepper motors:

- PLS (pulse) function - pulse generator output
- PWM function - pulse width modulation output. This function can also be used for applications with light or sound intensity control (dimmer or volume control function).

#### PLS function (pulse, 7 kHz) (1)

The PLS function block generates pulses of fixed ratio. In some cases, the frequency can be fixed and in others it is variable (as in control of slopes when driving a stepper motor). The %PLS function block can be programmed to generate a specific number of pulses.

%PLS function blocks are assigned to outputs %Q0.0.0 or %Q0.0.1 on Twido base controllers.

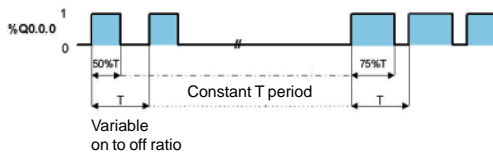
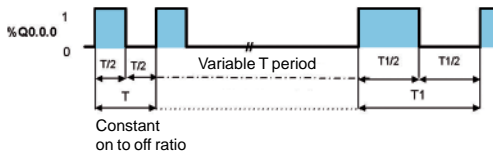
The pulse generator signal has a variable period, but with a constant duty cycle which establishes an ON to OFF ratio of 50% of the period (see illustration opposite).

#### PWM function (7 kHz) (1)

The PWM function block generates pulses of fixed frequency, with a variable ratio between the high state and low state of the output signal. The ON to OFF duration ratio is a dynamic variable called %PWM.R, with a range from 0% to 100%.

PWM function blocks are assigned to outputs %Q0.0.0 or %Q0.00.1 on a base controller. The PWM function can be used to control analog module outputs.

The user-defined %PWM function block generates a signal on output %Q0.0.0 or %Q0.0.1 of Twido base controllers (see illustration opposite).



#### Event processing

- Event management by the application.
- 2 priority levels
- 3 types of source:
  - 4 event sources based on the basic inputs
  - 4 event sources based on the very fast threshold counter (VF counter)
  - 1 event source based on the periodic event (Timer)
- Command masked and enabled by the system bits
- Each event executes a single user logic subroutine
- Updating of "reflex" outputs

#### PID

- 14 PID programming loops
- "Autotuning" algorithm (for software version  $\geq 2.5$ ).
- Analog/PWM output
- Linear conversion of measuring input
- 2 alarm levels (high and low) on the "measurement"
- Command output limits
- Direct and inverse action
- 2 animated modes for PID: configuration mode, debug mode

#### Online modification

This application can be debugged and adjusted in online mode. With this mode, the application program contained in the PC memory is identical to that in the controller memory. Program modifications can therefore be made directly in the Twido controller.

(1) 1 or 5 kHz maximum with the Twido Extreme controller (see page 41009/5).

### References

TwidoSuite bilingual software packages are for use on PCs (1) with Windows 2000 or Windows XP operating systems.

The software product comprises:

- A DVD-ROM including 5 TwidoSuite bilingual software with the hardware and software setup documentation
- Hard copy of the quick start guide

### TwidoSuite software

Description	Programming languages Languages of use	Reference	Weight kg
<b>TwidoSuite version V2.0 Multilingual</b> (1 DVD-ROM)	Ladder and Instruction List English/Chinese, English/French, English/German, English/Spanish and English/Italian	<b>TWD BTF U10M</b>	–

### Discover TwidoPack

Description	Composition	Reference	Weight kg
<b>TwidoPack Compact</b>	Compact base 10 I/O TWD LCAA 10DRF Real-time clock cartridge TWD XPD RTC Input simulator TWD XSM 6 USB/RS485 converter TSX CUSB 485 with cordset (0.4 m) TSX CRJMD25 TwidoSuite software on DVD-Rom TWD BTF U10M	<b>TWD XPD PAK6M</b>	–

### Components for connecting a PC to the controller

Description	Use		Length	Reference	Weight kg
	From	To			
<b>Connection cables</b>	Compact and modular Twido controllers (Mini-DIN) (2)	Serial port on PC with TwidoSuite software installed	2.5 m	<b>TSX PCX 1031</b>	0.170
		RJ45 on USB/RS 485 converter (3)	2.5 m	<b>TSX CRJMD25</b>	0.150
<b>USB/RS 485 converter</b>	Cable TSX CRJMD25 (RJ45)	USB port on PC (3) with TwidoSuite software installed	0.4 m	<b>TSX CUSB 485</b>	0.144

### Bluetooth wireless link

Description	Use	Reference	Weight kg
<b>Bluetooth gateway</b>	Range 10 m (class 2). Comprising: - 1 Bluetooth gateway with one RJ45 - 1 cable (length 0.1 m) with two RJ45 - 1 cable (length 0.1 m) with one RJ45 and a mini-DIN for TwidoSuite software - 1 RJ45/9-way SUB-D adaptor	<b>VW3 A8 114</b>	0.155
<b>Bluetooth gateway for PC</b>	Range 10 m (class 2) Required for a PC without Bluetooth technology Connection on PC USB port	<b>VW3 A8 115</b>	0.010

### Ethernet network interface

Description	Characteristics	Reference	Weight kg
<b>TwidoPort interface module</b> for all bases version ≥ 3.0	10/100 Mbps. Auto MDIX function Ethernet network connection on RJ45 connector Supplied with connection cable for Twido base TWD XCA RJP03P	<b>499 TWD 01100</b>	0.200

(1) Minimum configurations, see page 41008/2.

(2) For connection of Twido Extreme, see page 41009/9.

(3) To connect the Twido controller to the USB port of a PC, you need to add two other product references: cable **TSX CRJMD25** and USB/RS 485 converter **TSX CUSB 485**.



TSX PCX 1031



TSX CUSB 485



VW3 A8 114



VW3 A8 115



499 TWD 01100