

IP 20 distributed inputs/outputs

Distributed I/O system for network or fieldbus Advantys OTB



Presentation

There is an increasing tendency for machine manufacturers to design their automation systems using modular architectures. The use of inputs/outputs (I/Os) is becoming more and more common. The Advantys OTB offer is an ideal solution for "optimised" type distributed input/output requirements. This offer has been designed to provide the right technical-economical balance and to meet the needs of machine manufacturers and users seeking the best compromise between size, ease of cabling, setting-up and costs. Open and modular, the Advantys OTB solution enables the creation of industrial I/O islands managed by a master controller (PLC, PC or variable speed drive) via a fieldbus or communication network.

With its expandable block type architecture, the Advantys OTB solution adapts to all configurations of automation system islands. The Advantys OTB offer is particularly economical for small and medium size islands. In addition, the optimised sizes of this offer are ideally suited to the size of enclosures for distributed I/Os, that are located as near to the machine as possible. This solution reduces cabling time and costs and at the same time takes into account the modular architecture of the machine.

Furthermore, the Advantys OTB offer proposes fewer references relating to spare parts and accessories that are required for creating an island.

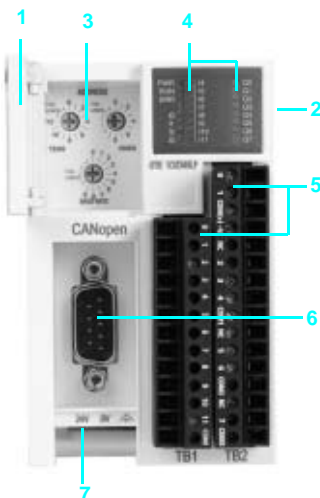
The Advantys OTB offer has also been designed to be as simple as possible. This offer includes 3 communication bases (interface modules) for the various types of network or fieldbus: CANopen, Ethernet TCP/IP or Modbus RS 485 Serial Line. Inputs and outputs are directly integrated in the interface modules. Each base incorporates 20 I/O:

- 12 \pm 24 V inputs,
- 6 relay outputs,
- 2 \pm 24 V solid-state outputs.

All the bases use a \pm 24 V supply. Of monobloc design, each Advantys OTB interface module can be fitted with expansion modules.

With its range of I/O expansions, the Advantys OTB offer provides a modularity that allows all requirements to be met, commencing with a base that can be fitted with up to 7 digital or analogue I/O modules. The expansion modules, like the interface modules, simply clip-on to 35 mm symmetrical rail and enable configurations of up to 132 digital I/O and up to 48 analogue I/O channels, or a mixture of both types (within the limit of 7 expansion modules), to be obtained.

Sensors and actuators are connected to the interface modules and I/O expansion modules using removable screw terminal blocks. All Advantys OTB modules provide an IP 20 degree of protection. To simplify sensor and actuator connections, as well as linking commons, the Advantys OTB offer also includes a commoning module. This module, as with all the other modules of the Advantys OTB range, allows the through connection of the internal bus or network (passively in this case) and enables connection of the commons in two isolated groups for each commoning module.



Description

The Advantys OTB 1●0 DM9LP (1) interface modules comprise:

- 1 An access door to the speed and network address coding wheels.
- 2 A connector for expansion modules (right-hand side).
- 3 Three coding wheels (island address and bus or network communication speed adjustment).
- 4 Indicator lights (communication status and I/O states).
- 5 Screw terminal connectors for connection of inputs/outputs.
- 6 Connectors for connection of bus or communication network.
- 7 Terminals for connection of \pm 24 V supply.

Mounting: the interface modules mount on 35 mm symmetrical rail.

(1) Only the communication part is dedicated to each fieldbus or network and can differ, the general description remains the same.

Environmental characteristics				
Product certifications			cULus	
Temperature	Operation	°C	0...+55	
	Storage	°C	-25...+70	
Relative humidity			30...95%, without condensation	
Degree of protection			IP 20	
Altitude	Operation	m	0...2000	
	Storage	m	0...3000	
Vibration resistance		Hz	10...57, amplitude 0.075 mm, acceleration 57...150 Hz	
		m/s ²	9.8 (1 gn)	
Shock resistance		m/s ²	147 (15 gn), for 11 ms	
Resistance to electrostatic discharge	Conforming to IEC 61000-4-2	kV	4 on contact, 8 in air	
Resistance to radiated fields	Conforming to IEC 61000-4-3	V/m	10	
Immunity to fast transient currents	Conforming to IEC 61000-4-4	kV	0.5 for the I/Os, 1 for the 24 V supply	
Mounting			On 35 mm symmetrical rail	
Interface module characteristics				
Interface module type		OTB 1E0 DM9LP	OTB 1C0 DM9LP	OTB 1S0 DM9LP
Type of bus/network		Ethernet TCP/IP Modbus	CANopen	Modbus RS 485 Serial line
Transmission	Transfer rate	10 or 100 Mbits/s	10 Kbits/s...1 Mbits/s	1.2...38.4 kbauds
	Medium	Dual twisted pair, ConneXium	Shielded dual twisted pair	Dual twisted pair
Structure	Type	10/100 BASE-T	EN 50325 ISO 11898	Modbus.org
	Method	CSMA-CD	CSMA-MA, multimaster with priority	Master-slave
Configuration	Maximum number of devices	256 max. per segment, unlimited using switches	127	32 per segment
	Maximum length of bus/network	m	500 (1000 with ConneXium)	30 (1 Mbits/s) 5000 (10 Mbits/s)
Type of port (bus/network connector)		RJ 45	SUB-D (DB9)	2 x RJ 45
Power supply	Nominal	V	24, non isolated	
	Voltage limits	V	20.4...26.4 including ripple	
	Maximum input current	mA	700 (at 26.4 V)	
	Maximum inrush current	A	50	
Consumption		W	19 (interface module with 7 I/O expansion modules)	
Number of 24 V inputs			12	
Number and type of outputs			6 relay 2 solid-state, source (PNP)	
Input/output connections			Removable screw terminal block	
Input/output expansion	Maximum number of modules		7	
	Maximum number of I/O		132 with screw/spring terminals, 244 with modules incorporating type HE10 connector	
Integrated functions				
Counting	Number of channels		4	
	Frequency	kHz	5 x 2 channels, 20 x 2 channels	
	Capacity		32 bits x 2 channels	
Movement	Number of channels		2	
	Frequency	kHz	7	
	Functions		PWM (output with pulse width modulation), PLS (pulse generator output)	

Input characteristics			
Number of input channels			12
Nominal input voltage		$\equiv V$	24, sink or source (positive or negative logic, PNP or NPN)
Common			1
Input voltage limits		$\equiv V$	20.4...26.4
Nominal input current		mA	5 for I0 and I1, I6 and I7; 7 for the others
Input impedance		kΩ	5.7 for I0 and I1, I6 and I7; 4.7 for the others
Filtering time	At state 1	μs	35 for I0 and I1, I6 and I7; 40 for the others
	At state 0	μs	45 for I0 and I1, I6 and I7; 150 for the others
Isolation			No isolation between channels, isolation with internal logic using photocouplers

Transistor output characteristics (solid-state)			
Number of output channels			2
Output logic			Source (positive logic, PNP)
Common			1
Nominal output values	Voltage	$\equiv V$	24
	Current	A	0.3
Output value limits	Voltage	$\equiv V$	20.4...28.8
	Current per channel	A	0.36
	Current per common	A	1
Response time	At state 1	μs	5 for Q0 and Q1; 300 for other outputs
	At state 0	μs	5 for Q0 and Q1; 300 for other outputs
Voltage drop (voltage at state 1)		$\equiv V$	1 max.
Maximum inrush current		A	1
Leakage current		mA	0.1
Overvoltage protection		$\equiv V$	39
Maximum power (filament lamp)		W	8
Isolation			No isolation between channels, isolation with internal logic using photocouplers

Relay output characteristics			
Number of output channels			6
Commons	Common 1		3 contacts (relay) NO
	Common 2		2 contacts (relay) NO
	Common 3		1 contact (relay) NO
Nominal output values (1) (resistive or inductive load)	Voltage	$\equiv V$	30
		$\sim V$	240
	Current per channel	A	2
	Current per common	A	8
Minimum switchable load		mA/$\equiv V$	0.1 (reference value)
Contact resistance (unused condition)		mΩ	30 max.
Insulation voltage (rms)		$\sim V$	1500 for 1 minute
Consumption for all the outputs	At state 1	$\equiv 5 V$	mA 30
		$\equiv 24 V$	mA 40
	At state 0	$\equiv 5 V$	mA 5

Commoning block characteristics			
Commoning block type		OTB 9ZZ 61JP	OTB 9YZ 61JP
Application		Passive, inter-module	Last expansion module
Commons		2 groups of 10 terminals	
Nominal output values (1) (resistive or inductive load)	Voltage	$\equiv V$	19...30
		$\sim V$	215...240
	Current per channel	A	2
	Current per group of commons	A	8

(1) With 1800 operations max./hour:
 - electrical life: 100,000 operations min.,
 - mechanical life: 20 x 10⁶ operations min.

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OTB 1C0 DM9LP



OTB 1E0 DM9LP



OTB 1S0 DM9LP

Interface modules with integrated digital I/O

Supply voltage	Number and type of inputs			Number of commons	Connection by	Fieldbus or network	Reference	Weight
	solid-state outputs	relay outputs	I/SO/RO (1)					kg
24 V	12 I	2 O	1/1/3	Removable screw terminal block	CANopen	OTB 1C0 DM9LP	0.195	
24 V IEC type 1	0.3 A	6 O	Ethernet TCP/IP/Modbus		OTB 1E0 DM9LP	0.185		
		30 V / ~ 240 V 2 A	Modbus RS 485 Serial line		OTB 1S0 DM9LP	0.190		

Separate components

Description	Usage	Number of commons	wires	Reference	Weight
					kg
Commoning modules	For grouping input or output commons, 8 A maximum; inter-module	2 isolated groups	2 x 10	OTB 9ZZ 61JP	0.100
	For grouping input or output commons, 8 A maximum; last expansion module	2 isolated groups	2 x 10	OTB 9YZ 61JP ▲	0.085
Documentation	Hardware and software user guides	–	–	FTX ES00	0.050

Accessories

Description	Usage	Type of connector	Length m	Unit reference	Weight
					kg
End of line adaptors (sold in lots of 2)	For end of RS 485 line, R = 120 Ω, C = 1 nF	RJ 45	–	VW3 A8 306 RC	0.200
"T" tap-offs, Modbus		1 x RJ 45 male and 2 x RJ 45 female	0.3	VW3 A8 306 TF03	–
			1.0	VW3 A8 306 TF10	–
			3.0	VW3 A8 306 D30	0.150
Connection cables for Modbus bus Serial line	RJ 45 connection (with screw or spring connector) Point-to-point connection	1 x RJ 45 one end, free wires other end 2 x RJ 45	0.3	VW3 A8 306 R03	0.050
			1.0	VW3 A8 306 R10	0.050
			3.0	VW3 A8 306 R30	0.150
Shielded dual twisted pair cables	RS 485	Without connector	100	TSX CSA 100	–
			200	TSX CSA 200	–
			500	TSX CSA 500	–

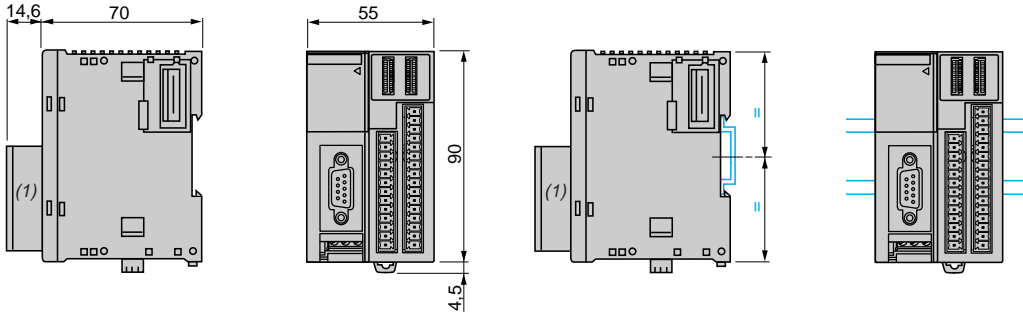
(1) Input, Solid-state Output, Relay Output.

▲ Availability planned for 1st quarter 2005.

Dimensions

OTB 1●0 DM9LP

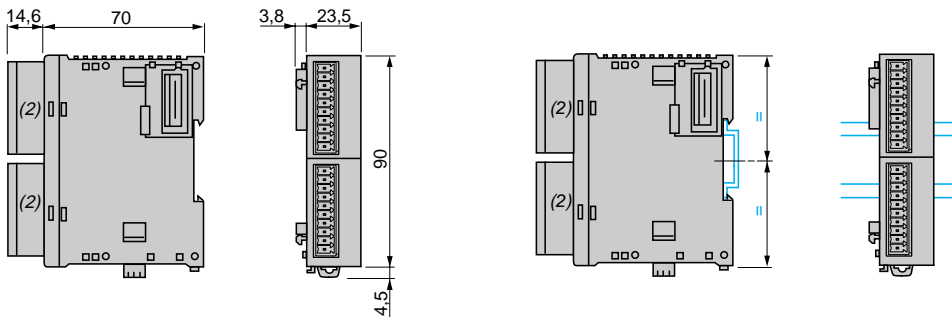
Mounting on symmetrical 35 mm \perp rail



(1) With removable screw terminal block type connector.

OTB 9●Z 61JP

Mounting on symmetrical 35 mm \perp rail

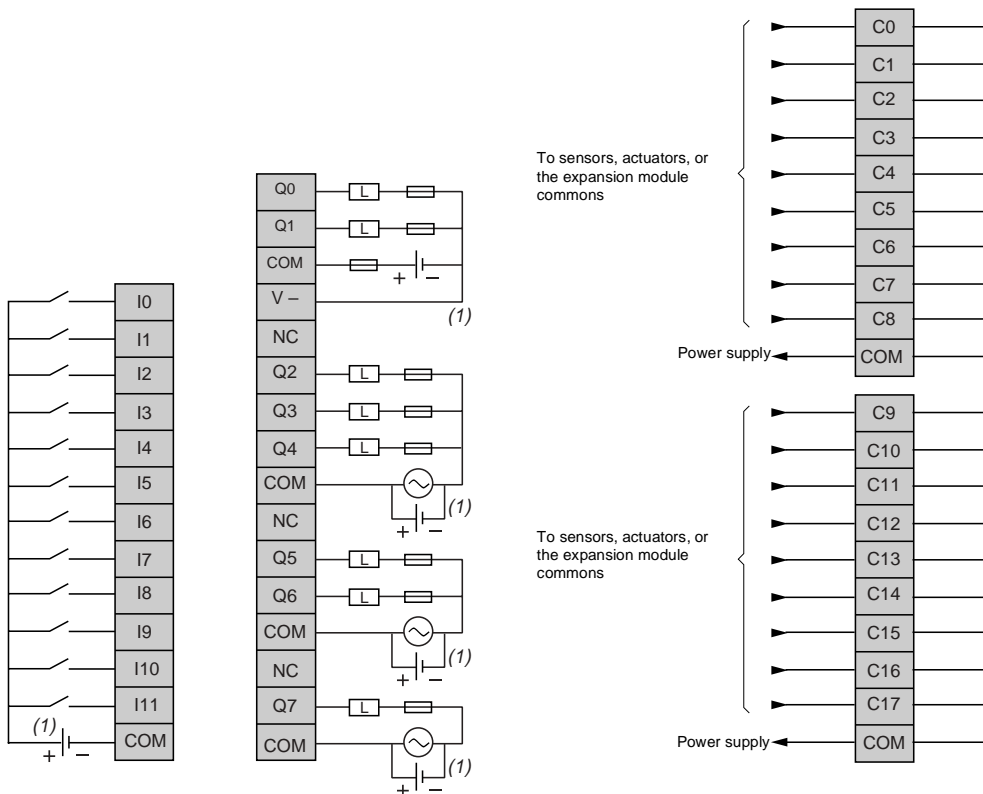


(2) With removable screw terminal block type connectors.

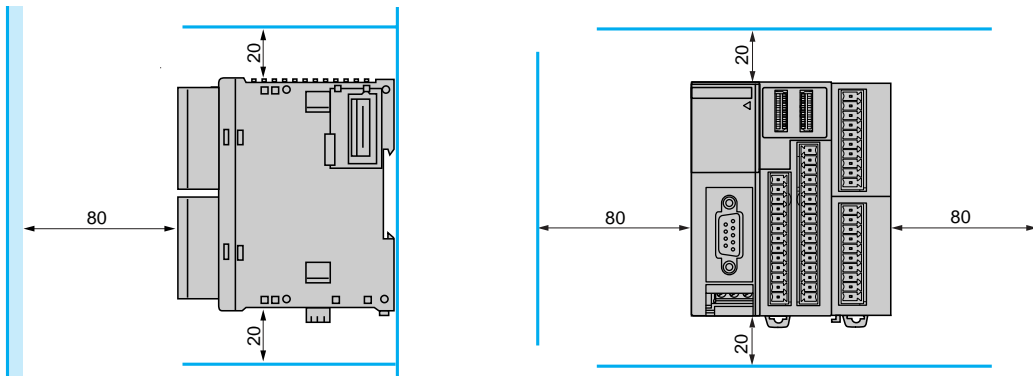
Schemes

OTB 1●0 DM9LP

OTB 9●Z 61JP



Installation rules



Important:

- Must not be horizontally or flat mounted
- Avoid placing the module over a source of heat (transformer, power supply, power contactor, etc.)