

## mxCONTROL Multifunction Controller



Type 8620 can be combined with...



**Type 7800**

Digital dosing pump



**Type 8645**

Extended I/O  
FreeLINE



**Type 8035**

INLINE Paddlewheel  
Flowtransmitter



**Type 8010**

Flow switch



**Type 8223**

Inductive Conductivity  
transmitter



**Type 6213**

On/Off Brass  
Solenoid valve

The mxCONTROL multifunction controller, is a microprocessor controller designed to automate the control of process variables within a water treatment system (e.g. boiler, cooling tower or Reverse Osmosis system).

Sophisticated electronics and state of the art control algorithms ensure that optimum process control is maintained at all times, with minimal operator intervention.

The controller is capable of processing numerous combinations of analog and digital in- and outputs. Combined with an easy to read large graphic display backlight in three languages, EN, DE, FR. Other languages on demand.

The controller is highly software based. It can easily be configured/parameterized using a PC tool and SD card or USB interface. Alternatively, the optional Ethernet interface can be used to configure and to parameterize the controller. Local manual parameterizing of the controller can also be achieved via the five soft-touch keys.

The controller is delivered with the SD Card containing sample configuration files and Instruction Manuals.

There are 3 levels of Man-machine interface. Open access, Operator Only Access, Specialist Access.

- Data and event logging
- One controller hardware with dozens of configuration possibilities quickly downloaded via SD card (supplied) or via USB interface
- Ethernet or modem communication with email or call event notification & numerous input/output control signals

### Technical data


#### General details of the device

<b>Enclosure</b>	With sealed keypad and display
<b>Enclosure outer dimensions L x W x H</b>	230 x 204 x 119 mm without cable glands
<b>Enclosure material</b>	PC (UL94) with transparent door and key
<b>Weight</b>	1.8 kg
<b>Degree of protection</b>	IP 65 with door closed and properly sealed cable glands, waterproof according to NEMA 4X, additional cover of USB port and SD card slot
<b>Display</b>	Graphic display, large and backlit 128 x 64 dots, two colored (blue and white)
<b>Keypads for manual operation</b>	5 keys for user inputs
<b>Operating temperature</b>	0 ... +50°C
<b>Storage temperature</b>	-20 ... +60°C

#### Electrical details

<b>Mains voltage (power supply)</b>	100 ... 240 V AC, 50/60 Hz, no adjustment necessary
<b>Power consumption (of mxCONTROL device)</b>	Max. 35 W (incl. sensor supply at Instrumentation Supply part)
<b>Total power consumption (using the internal power distribution)</b>	Max. 2400 W (at 240 V AC) or max. 1100 W (at 110 V AC) incl. connected actuators at Power Supply part
<b>Total input current <math>I_{in}</math> (using internal power distribution)</b>	Max. 10 A
<b>Total output current <math>I_{out}</math> (using internal power distribution)</b>	< 10 A (incl. device power consumption of 35 W)
<b>Instrumentation supply for sensors / transistor outputs</b>	24 V DC ( $\pm 5\%$ ), max. 1.04 A (25 W), short circuit and overload protected

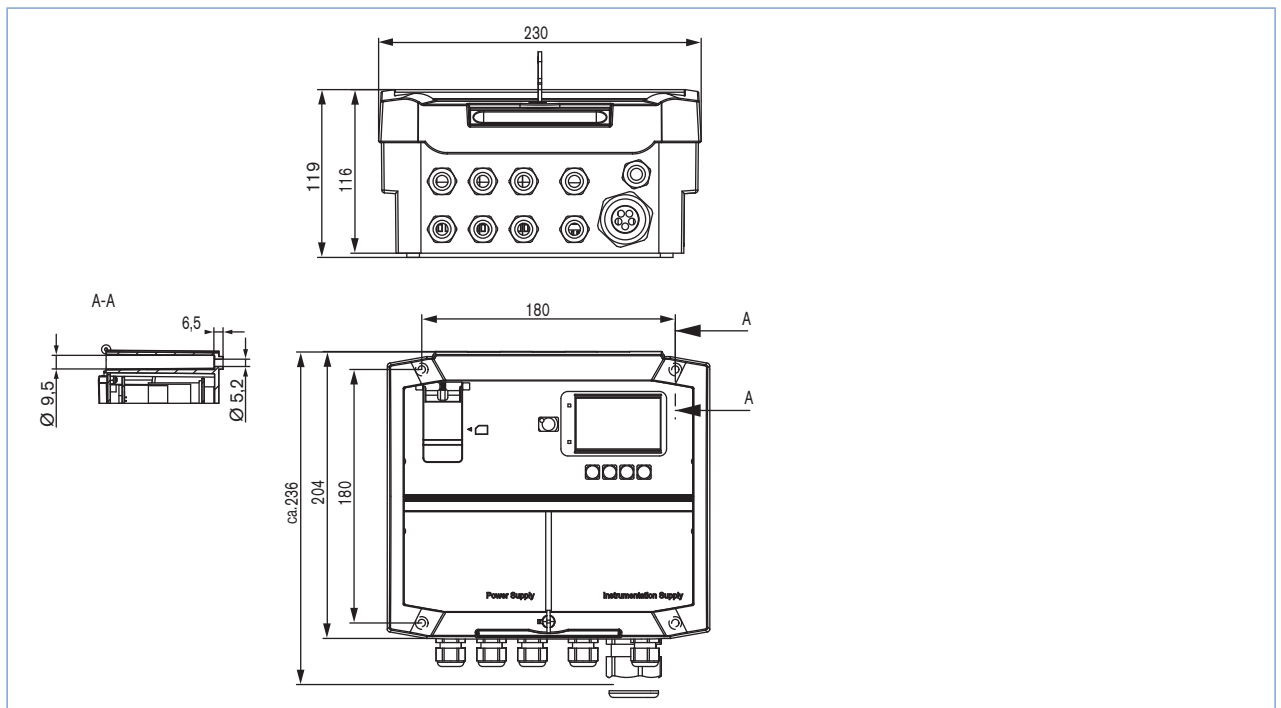
Technical data, cont.	
<b>Fuse for device protection (Instrumentation)</b>	Internal: electronic fuse, recovers automatically after fault condition is removed
<b>Fuse for relays outputs</b>	Relay outputs to be fused in external installation according to actuators
<b>Inrush current (typ.)</b>	Cold start: 30 A/230 V AC
Electrical connections	
<b>Power supply</b>	
Hardware version 1	Screw terminals, grid 5.08 mm, for wire gauges 0.14 ... 1.5/2.5 mm <sup>2</sup> (AWG 26 ... 14)
Hardware version 2	Spring type terminals, grid 5.0 mm, for wire gauges 0.2 ... 2.5/4.0 mm <sup>2</sup> (AWG 24 ... 12)
<b>Instrumentations supply</b>	
Hardware version 1	Screw terminals, grid 3.81 mm, for wire gauges 0.14 ... 1.0/1.5 mm <sup>2</sup> (AWG 26 ... 16)
Hardware version 2	Spring type terminals, grid 3.5 mm, for wire gauges 0.2 ... 1.5 mm <sup>2</sup> (AWG 24 ... 16)
<b>Cable glands and cables</b>	
Hardware version 1	9 x M16 (PG9)                      5 ... 6.5 mm cable 1 x M32 (PG21)                    5 ... 6 mm cable (5x)
Hardware version 2	4 x M16 (PG9)                      5 ... 6.5 mm cable 2 x M16 (PG9)                      6 ... 9.5 mm cable 3 x M20 (PG13)                    9 ... 13.5 mm cable 1 x M32 (PG21)                    5 ... 6 mm cable (5x) Cable diameters shown above are in reference to the outer diameter. The cable glands of the bottom row are equipped with sealing bolts
Thermal stability (cable material)	105°C for cables at Power Supply part 80°C for cables at Instrumentation Supply part
Internal equipment - Inputs	
<b>Inputs</b>	
Hardware version 1	4 analog inputs (4 ... 20 mA or Pt100 - software-configurable) + 4 digital inputs (On/Off or Freq)
Hardware version 2	4 analog inputs 4 ... 20 mA + 2 Pt100 + 4 digital inputs (On/Off or Freq) + 4 digital inputs (On/Off)
Analog inputs - Characteristics	
<b>Input resistance of 4 ... 20 mA inputs</b>	Max. 300 Ω
<b>Measuring error of 4 ... 20 mA inputs</b>	< 0.2% of FS
<b>Range of Pt100 inputs</b>	-20 ... +150°C
<b>Measuring error Pt100 inputs</b>	Max. ±0.25 K 3 wire connection and software compensated wire resistance required
Digital inputs - Characteristics	
<b>Logical values on/off inputs</b>	1 or HIGH: 13 ... 35 V; 0 or LOW: 0 ... 4.5 V
<b>Input resistance of on/off inputs</b>	≥ 20 kΩ
<b>Max. frequency</b>	2 kHz
<b>Duty factor frequency</b>	1 : 1
<b>Measuring error frequency</b>	Max. 0.2% of FS
<b>Input accepts signals from</b>	Open collector; open emitter; push-pull output; hall effect; reed switch; micro switch
Internal Equipment - Outputs	
<b>Outputs</b>	
Hardware version 1	5 Relay outputs + 4 analog outputs 4 ... 20 mA (optional) + 4 Transistor outputs (optional)
Hardware version 2	5 Relay outputs + 2 analog outputs 4 ... 20 mA + 2 Transistor outputs
<b>4 ... 20 mA analog outputs - Characteristics</b>	Max. 500 Ohmic load, output resolution 10 bit (effective >9 bit)

Technical data, cont.	
<b>Relay outputs - Characteristics</b>	Max. 250 V AC/DC, max. 10 A, potential-free, two-way SPDT contacts, max. 2500 VA (AC), max 40 W Ohmic load (DC), 3 million switching cycles at 1 A, 10 million switching cycles at 0 A
<b>Transistor outputs - Characteristics</b>	24 V DC, Switching capacity each max. 16 W, pnp, max. 2200 Hz
Further internal equipment	
<b>Micro-controller core</b>	32 bit with integrated flash memory
<b>Slot for SD card (memory card)</b>	Can be used for data logging, up- and download of configuration and parameter files
<b>Clock</b>	Real-time clock with calendar
<b>Battery back-up for real-time clock</b>	Lithium battery CR2032, exchangeable, approx. 10 years service life
Communication	
<b>SD card</b>	SD card capacity: minimum 64 MB, maximum 2 GB, formatted with FAT16 file system
<b>Up-/download of configuration data and parameters</b>	Via USB or SD card
<b>Data-logging</b>	On SD card
<b>Firmware update</b>	Via USB
<b>USB slave interface</b>	Standard USB interface for PC communication
<b>Ethernet interface</b>	Optional: Ethernet interface for easy diagnosis including Web Server and email option
<b>Extension bus interface</b>	CAN-based bus for connection of extension units (e.g. I/O extensions)
Controller structure	
<b>Number of control loops</b>	Max. 8 active control loops
<b>Controller outputs/Module outputs</b>	1) On/Off 2) Pulse frequency modulated (fixed pulse length, variable pauses) 3) Pulse width modulated 4) Analog
<b>Sample period</b>	Approx. 50 ms (with 1 ... 4 active control loops); Approx. 100 ms (more than 4 active control loops)
<b>User configuration</b>	Cascade control possible; inputs, outputs and control function designations can be changed via configuration file
Norms and standards	
<b>Environment standards</b>	IEC 68
<b>EMC standards</b>	EN 61000, EN 55011
<b>CE mark</b>	Applicable tests resulting in CE mark
<b>UL-Listed for US and Canada</b> 	61010-1 + CRN/CSA-C22 No.61010-1

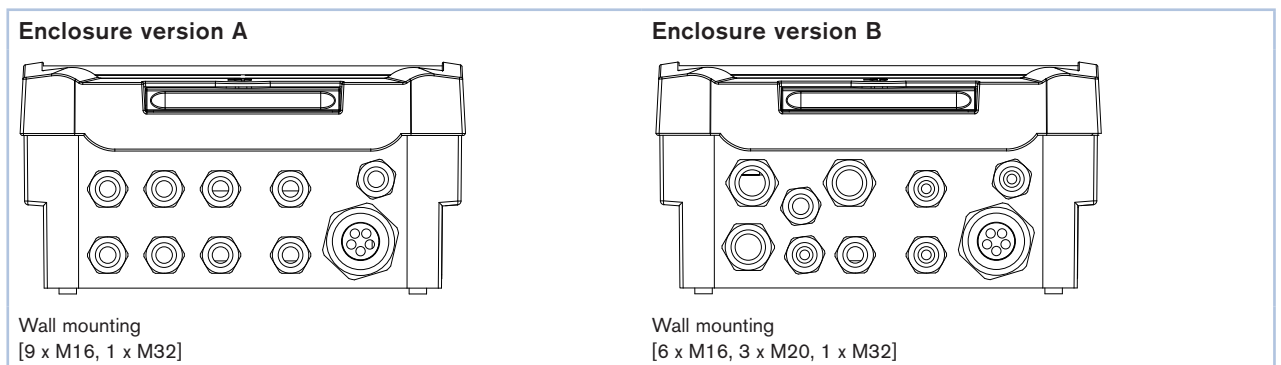
Ordering chart (other versions on request)

Electrical connection	Hardware version	Inputs						Outputs			Communication		Item no.
		Analog inputs 4 ... 20 mA	Pt100 inputs	Analog inputs 4 ... 20 mA or Pt100	Digital inputs (On/Off)	Digital inputs (On/Off or Freq)	Analog outputs 4 ... 20 mA	Relay outputs	Transistor outputs	Ethernet	Enclosure version		
Screw terminals	1	-	-	4	-	4	-	5	-	-	A	188 133	
		-	-	4	-	4	4	5	4	X	A	188 136	
Spring type terminals	2	4	2	-	4	4	2	5	2	-	B	188 137	
		4	2	-	4	4	2	5	2	X	B	188 138	

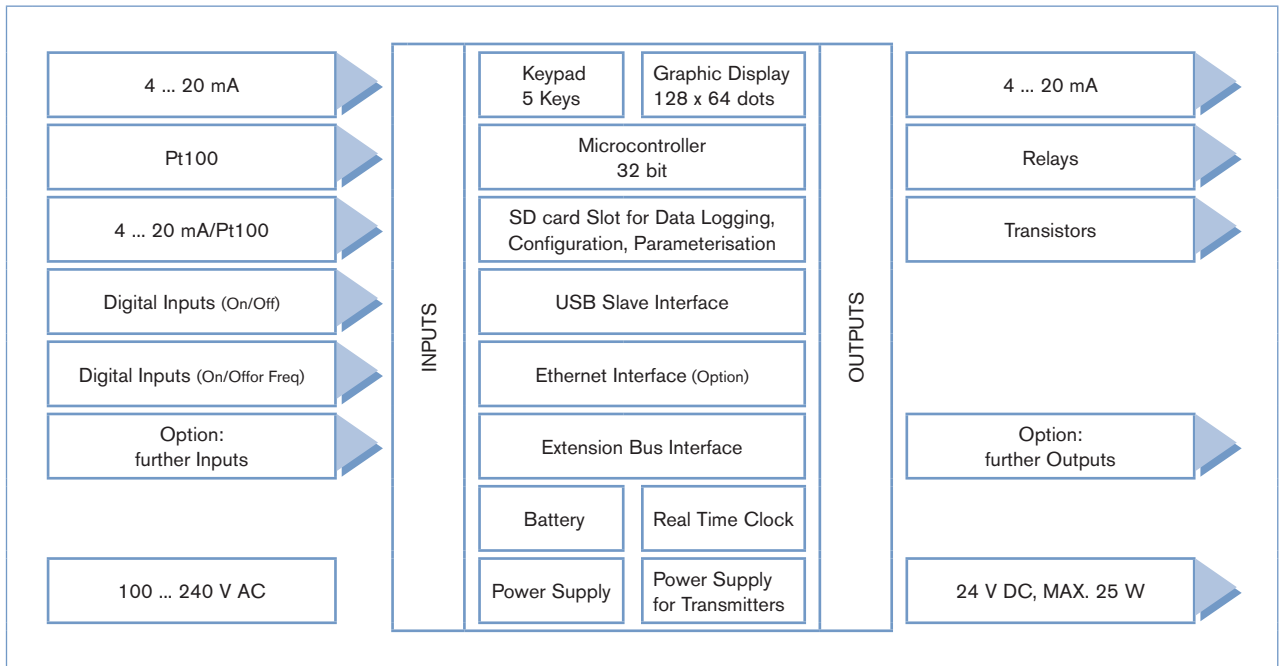
Dimensions [mm]



Enclosure versions

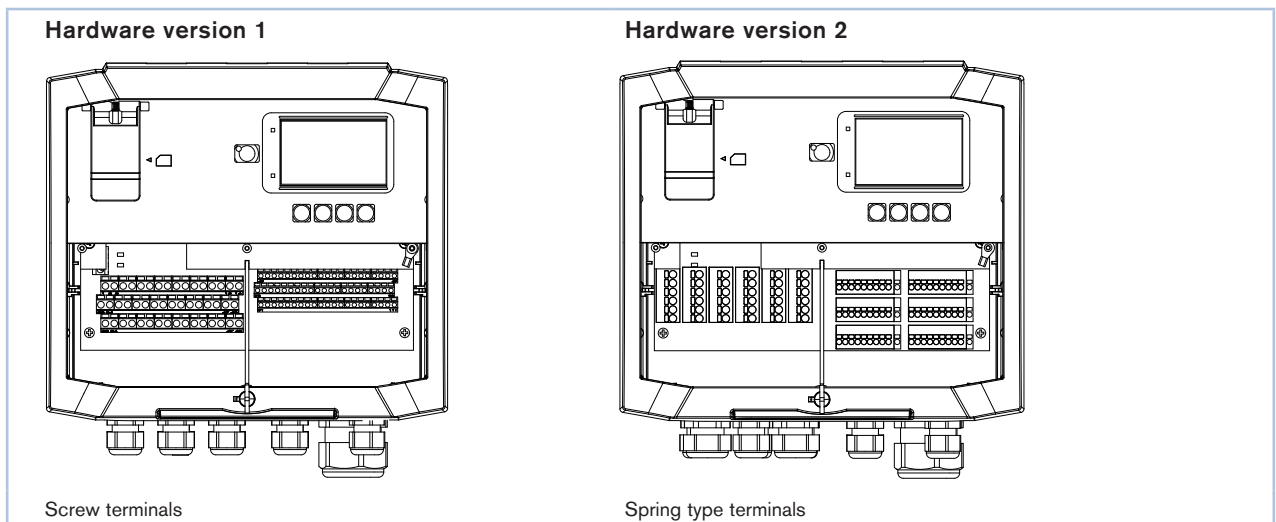


### Hardware structure

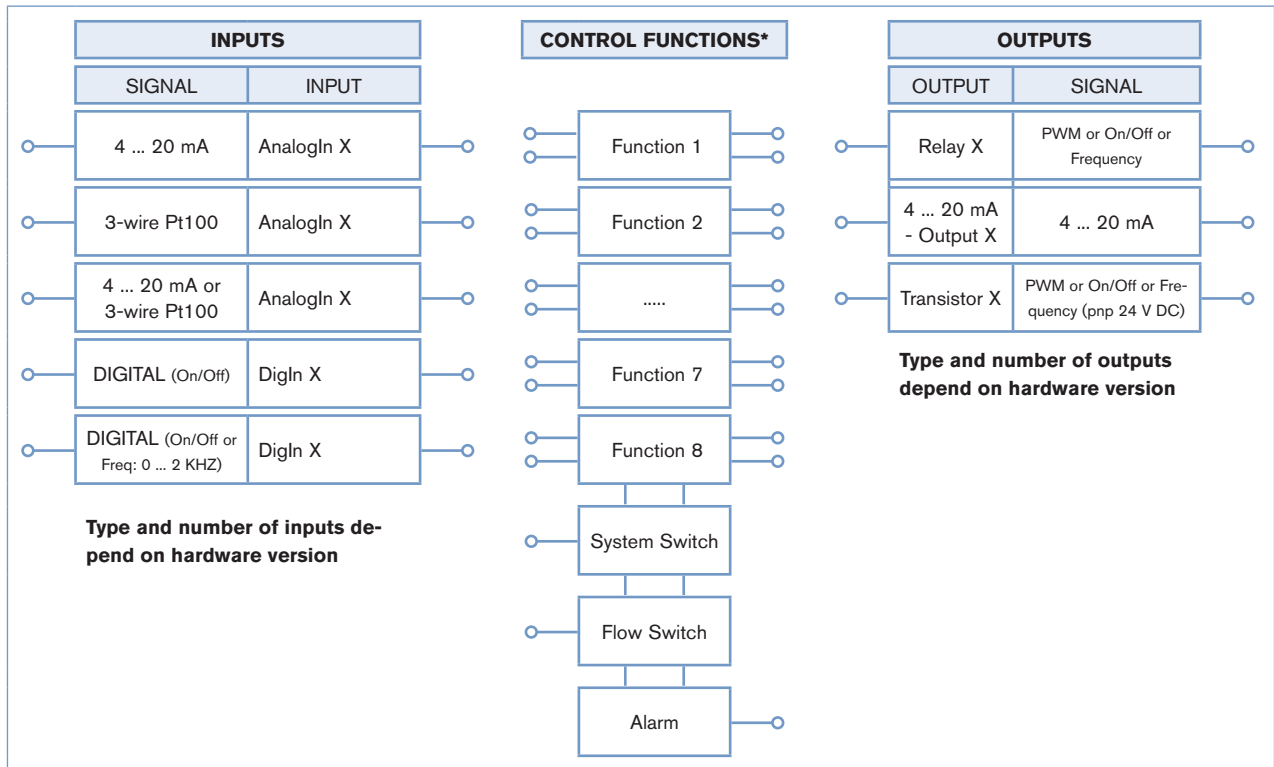


### Hardware versions

		Hardware version 1	Hardware version 2
Inputs	Analog 4 ... 20 mA	–	4
	Analog Pt100	–	2
	Analog 4 ... 20 mA / Pt100	4	–
	Digital (On/Off)	–	4
	Digital (On/Off or Freq)	4	4
Outputs	Analog 4 ... 20 mA	4 (optional)	2
	Relay	5	5
	Transistor	4 (optional)	2



## Process diagram



### Easy configuration / parameterization using a PC tool

Input configuration including scaling, filtering, alarm limits, engineering units

Selection of control functions and input - output - assignment

Output configuration

## Control Functions

### General PID control

PID process controller for fixed value, subsequent value or cascade control

### Conductivity control

On/off or PI control - continuous dosing through pulse frequency modulation (PFM), PWM or 4-20mA analog output, automatic or manual drain

### Corrosion display

No controller function, only display of measuring values; impact on general alarm output

### pH control

PI control - continuous dosing through pulse frequency modulation (PFM), PWM or analog output

### Module for dosing of oxygen scavenger media

Proportional dosing for flow and oxygen content depending on flow with or without temperature input

### Chlorine / Redox Control

PI control - continuous dosing through pulse frequency modulation (PFM), PWM or 4-20mA analog output

### Batch dosing

Allows batching of a chemical based on volume of water added

### Biocide dosing

14-day program, 8 dosing events per channel / per day; Pre-bleed function to optimize biocide kill time

### Monitor module

Display of process value

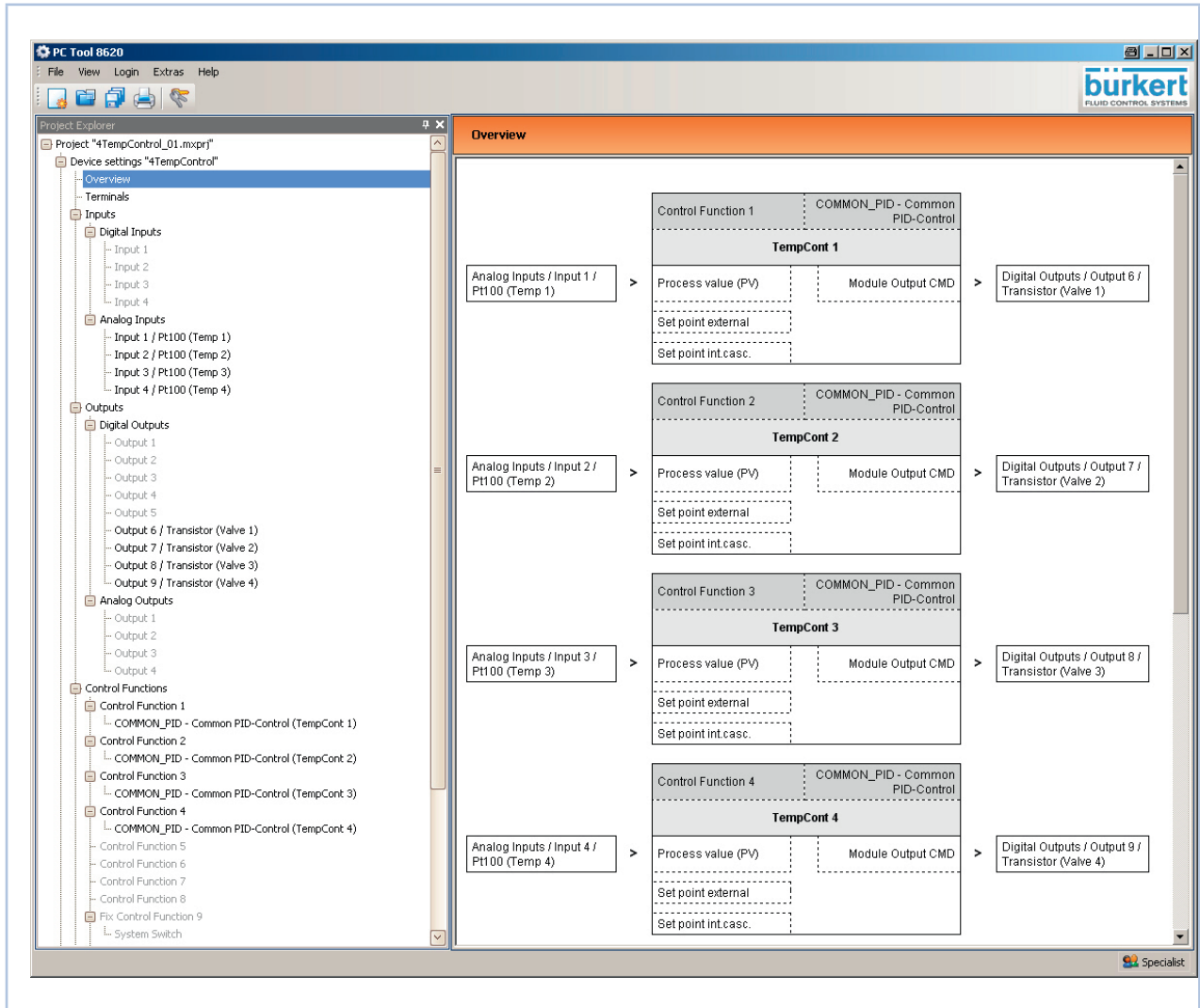
### Totalizer function

Single or dual channel flow totalizer (each having two manually resettable totalizers)

### PC Tool

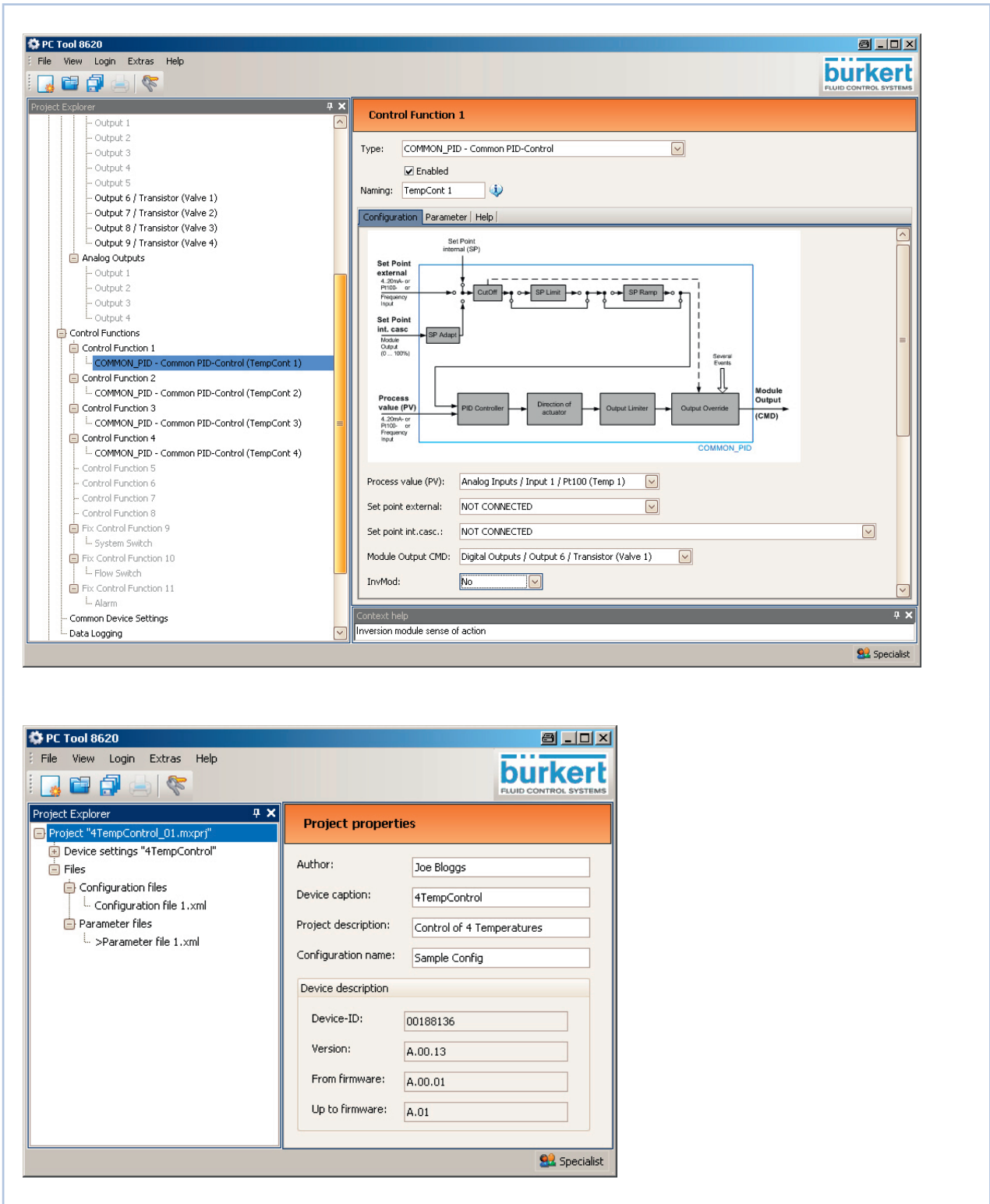
...for easy configuration and parameterization to be downloaded from [www.burkert.com](http://www.burkert.com)

The screenshots below are part of a configuration for a 4 loop temperature control system used for cooling of an injection moulding machine.



PC Tool, continued

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