pH/ORP Controller
Type M4020 / M4020R

- ✔ 3.5'' IPS touchscreen
- ✔ 2 x current output 0-20 mA
- ✔ 3 x changeover contacts (max. 5 possible)
- ✔ 20-253VAC/DC power supply
- ✔ Alarm function
- ✔ Modbus RTU via RS485 interface
- ✔ Data recording USB
- ✔ Easily configurable
- ✔ Galvanically isolated
- ✔ Frontpanel IP64 protected

Typical applications

- Routine monitoring and regulation in the field of environmental protection
- Neutralization plants / Electroplating
- Water treatment

Technical description

The very compact pH and ORP(mV) controller type M4020 is designed for automatic dosing or monitoring applications. The 3.5 inch IPS display with increased brightness allows reading of the measured value even if exposed to direct sunlight. The capacitive touch screen allows intuitive and fast operation.

The two-point controller consists of two floating changeover limit contacts which can be electronically adjusted over the entire range. The limit contacts can be used to control alarm devices, dosing valves and dosing pumps. The current measured value, the temperature and the device status are continuously displayed. For a control of non-linear titration curves the type M4020R is best suited. The M4020R type can handle steep non-linear titration curves with ease.

The instrument is supplied with a galvanically isolated wide range power supply from 20 to 253VAC/DC and as a pure measuring instrument only needs a pH electrode to be ready for operation. Temperature compensation is done manually or with an external Pt-100 probe. A defect of the Pt-100 probe is immediately indicated and triggers an alarm. The conditions for alarm triggering can be defined. The device settings can be code protected by means of an access code.

A USB stick can be used to automatically record the measured values. Two programmable, galvanically isolated signal outputs are also available. The choice of probes is not critical in terms of the device, but the appropriate probe should be selected for each application. Analog and digital sensors can be connected. The probe can be calibrated at any time via the intuitive and user-friendly menu.

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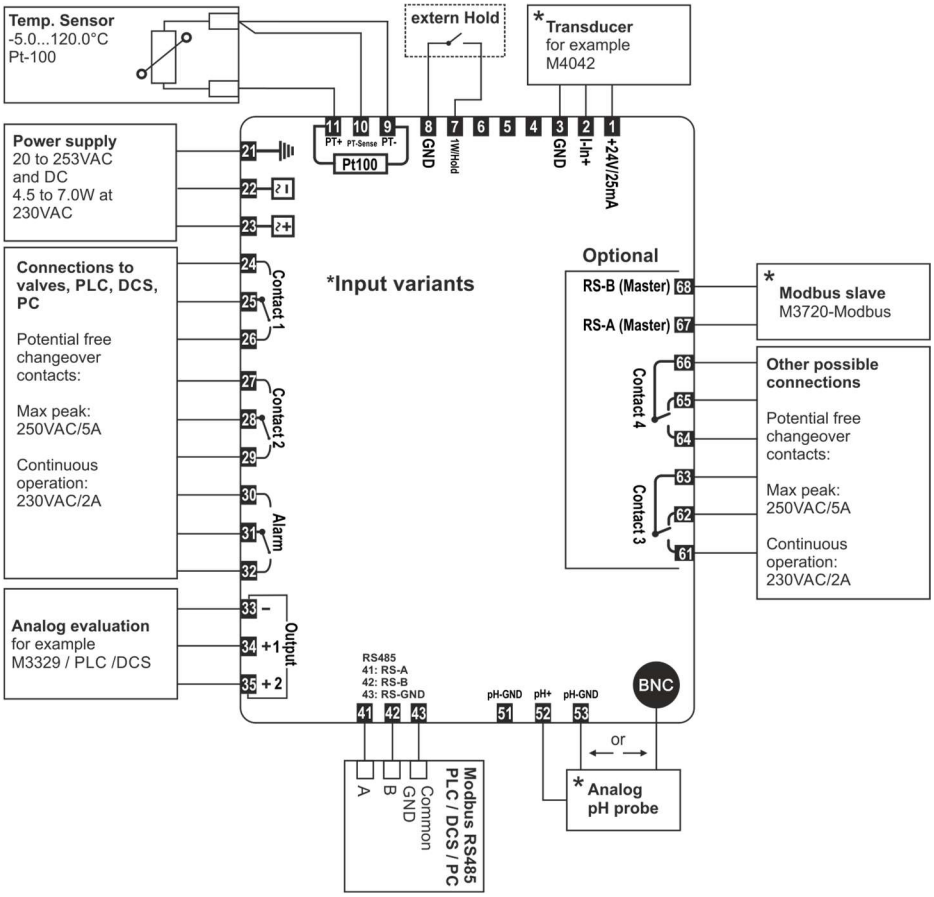
Technical data

Measuring ranges:	-2.00 to 16.00pH	-1000 to +1000mV
Accuracy typical: -Reproducibility: -Temperature coefficient: -Long-term stability:	0.01pH 0.1% zero drift: 30ppM/°C , gain drift: 25 ppM/°C 0.02pH	1mV at 23°C ambient temperature 3mV (per year at 23°C)
Power supply for loop powered sensors:	20VDC, max. 25mA	
Display: -Resolution:	sunlight readable 3.5'' IPS graphic display, 320x240 pixels 0.01pH	 1mV
Working temperature range:	-5°C to +45°C	
Max. humidity:	95%, non-condensing	
Analog pH input: - Input impedance: - Quiescent current:	BNC connector and terminals 1000GΩ (10^{12} Ω) max. 1.5pA	
Temperature input: - PT-100 Range: - PT-100 Accuracy:	PT-100 sensor 3-wire technology or manually -5.0 to 120.0°C 0.3°C	
Input for pH measured value:	analog, analog by loop powered transmitter (e.g. M3720-mA) digital by RS485 transmitter (M3720-Modbus) digital by ISM InPro (3250i, 3253i, 4260i, 4800i, ...)	
Current output: -Max load: -Output impedance:	2 outputs, 0 to 20mA, galvanically isolated, freely adjustable to pH and temperature, common reference, in case of alarm 3.6mA/22mA/off programmable In hold mode: hold/min/max/off programmable 500Ω typ. > 1MΩ	
Relay contacts: -Output: -Mode: -Limits: -Hysteresis: -Delay: -Minimum switch-on time: -Labeling on display: -Hold mode:	3 floating changeover contacts including the alarm contact floating changeover contacts, max. 5A, continuous 2A at 230V inductive load automatic or manual adjustable to pH/mV or temperature 5-200 parts adjustable 0-3600s on and/or off delay 0-10.00s 4 characters active/inactive/off adjustable	
Alarm:	2 limit values adjustable, wire break at PT-100, wire break at digital electrode, warning at full USB disk, pump runtime monitoring of switch contact 1 & 2, manual operation monitoring, alarm relay contact can be acknowledged on the display, behavior in hold mode active/inactive/off adjustable	
Digital interface:	RS-485, Modbus RTU protocol (standard: 38'400, 8N1)	
USB:	logger, recording period (1-7200s)	
Other features:	-device labeling, 16 characters on display -hold function of the current outputs/relays controlled by an external NO contact (not possible when ISM input is used) -settings can be copied from device to device via USB stick -firmware update via USB stick -the device settings can be protected with a 4-digit access code	

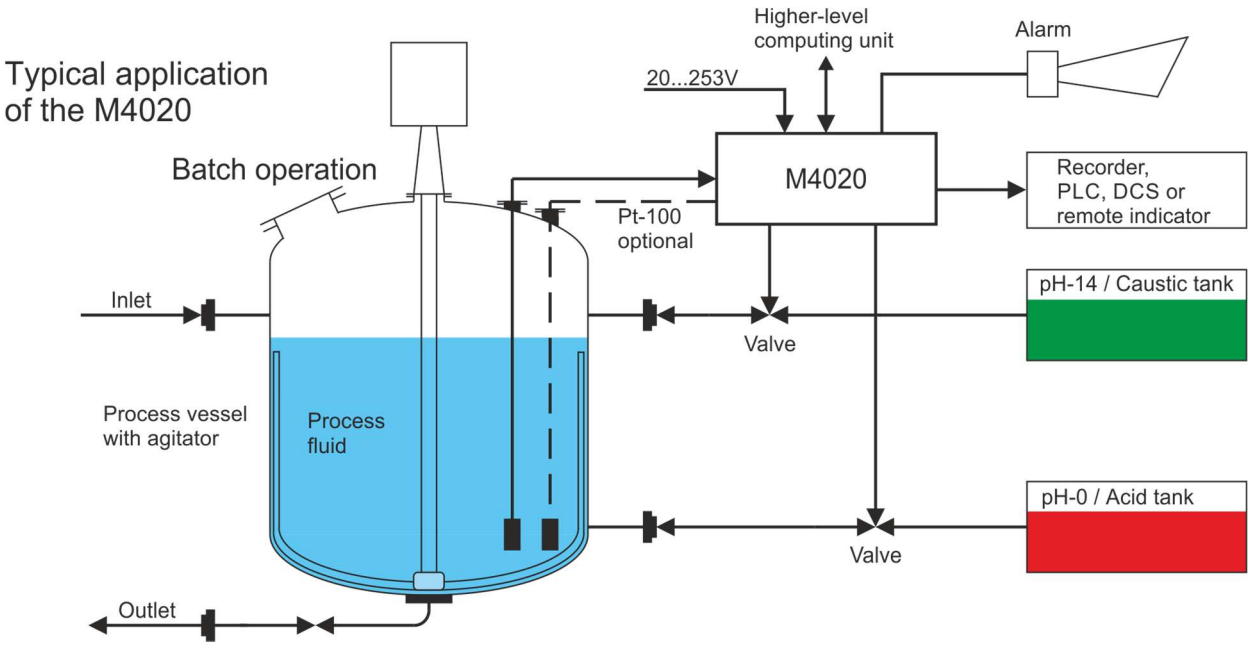
info@mostec.ch
Telephone +41 61 921 40 90

Auxiliary energy:	universal power supply: 20 to 253VAC or DC
Power consumption:	4.0W to 7.0W at 230VAC
CE conformity:	fulfilled
Connection type:	connector terminals: 2x 3 pin, 1x 6 pin, 1x 8 pin, 1x 9 pin, 1x 8pin 1x USB-A connector, 1x BNC connector option 5 relay contacts; one additional 1x 8 pin connector terminal
Fastening:	two quick release fasteners
Weight:	330g
Protection class:	front IP64 protected
Warranty:	2 years
Options:	-two additional relay contacts (5 relay contacts in total) -IoT gateway module for remote monitoring and alarming via LTE network (more information on request).

Wiring diagram



Typical connection type



Connections

1	Loop powered sens +	2	4-20mA input	3,8	GND	7	Hold input

9	Pt-100 probe (-)	10	Pt-100 sensor sense(-)	11	Pt-100 probe (+)

21	Grounding	22	Supply power (-)	23	Supply power (+)

24	Limit value 1: normally open contact (NO)	25	Limit value 1: changeover contact	26	Limit value 1: normally closed contact (NC)
27	Limit value 2: normally open contact (NO)	28	Limit value 2: changeover contact	29	Limit value 2: normally closed contact (NC)
30	Alarm contact: normally open contact (NO)	31	Alarm contact: changeover contact	32	Alarm contact: normally closed contact (NC)

33	Output GND	34	Signal output 1	35	Signal output 2

41	Modbus RS485-A	42	Modbus RS485-B	43	Modbus RS485-GND

51 53	pH-GND	52	pH measuring signal (+)	BNC	Center pin: pH (+) Com./case: pH-GND

Additional clamp (optional)

61	Limit value 3: normally open contact (NO)	62	Limit value 3: normally closed contact (NC)	63	Limit value 3: changeover contact
64	Limit value 4: normally open contact (NO)	65	Limit value 4: normally closed contact (NC)	66	Limit value 4: changeover contact

67	Modb. RS485 Master-A	68	Modb. RS485 Master-B

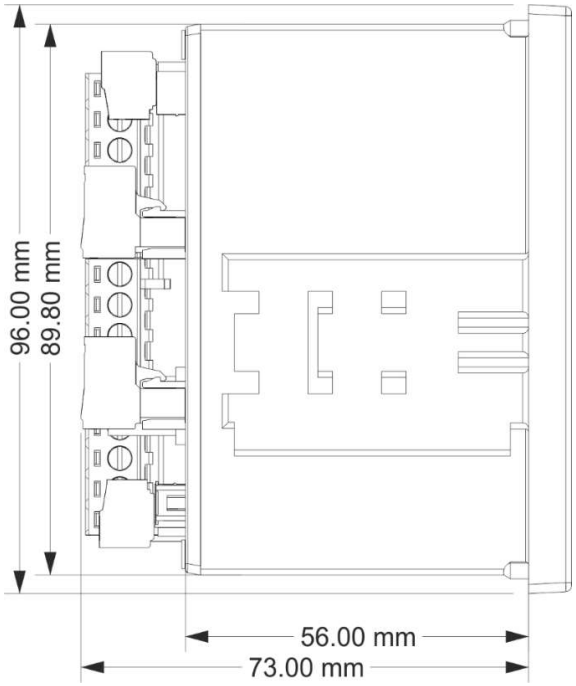
Part numbers / Order numbers

Item number	Description
M4020	two-point controller
M4020R	PID controller
-option GW	additional limit contacts 4/5
-option Modbus master	Modbus master for M3720 Slave

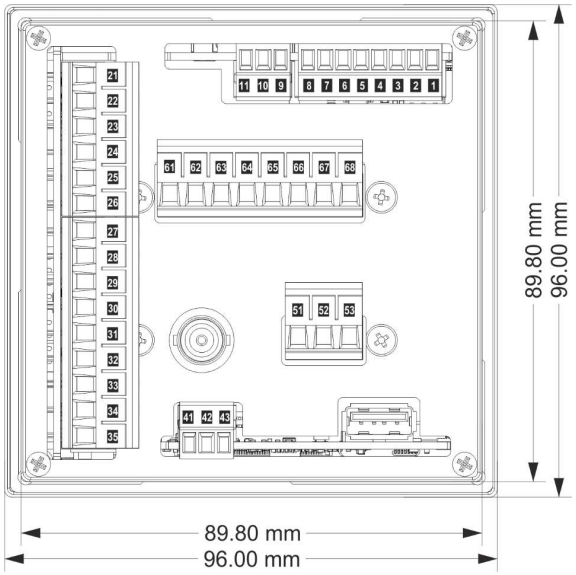
Dimensions

Front panel mounting requires a 91x91mm cutout.

Side view:



Rear view:



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