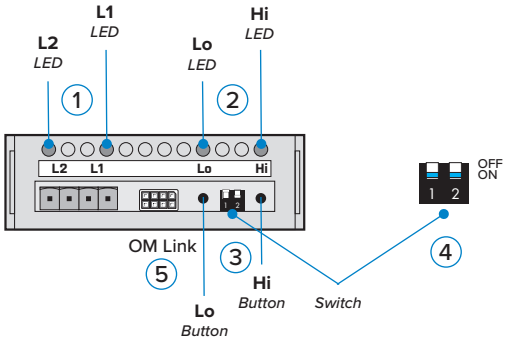
OMX 333UQC

Digital signal converter

UNIVERSAL COUNTER

1 Description

- Input > Counter/Frequency/Time
- Range 0,1...50 000 Hz
- Scaling of measured values
- Input filter, Linearisation
- Output > Analogue/Data/Relays
- Setting from PC via OM Link
- Easy installation to DIN rail



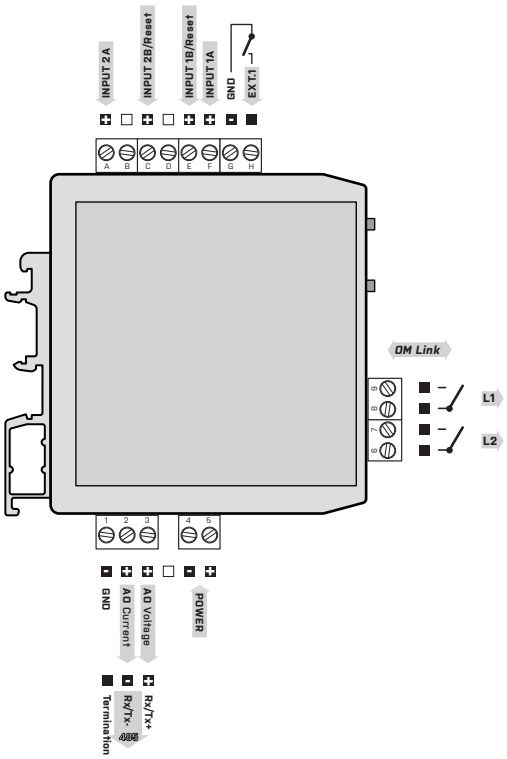
① ✱ LED - Limits 1 and 2
② ✱✱ LED - signalization of various states
③ Interaction buttons
④ Dip switch
⑤ OM Link to USB interface connector

Note: There is galvanic connection between OM Link connector and input!

⚠ DANGER ⚠	⚠ WARNING ⚠	⚠ CAUTION
HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH - Disconnect all power before servicing equipment and other supply lines Failure to follow this instruction will result in death or serious injury.	**EQUIPMENT OPERATION HAZARD** - Do not use this product in safety critical system. - Do not disassemble, repair or modify this product. - Do not operate beyond the recommended operating environment. Failure to follow these instructions can result in death, serious injury, or equipment damage.	**EQUIPMENT OPERATION HAZARD** - Install 100 mA fuse UL...Class CC ; IEC...gG Failure to follow this instruction can result in injury or equipment damage

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel.
No responsibility is assumed by ORBIT MERRET for any consequences arising out of the use of this material.

2 Product Connection



CONNECTIONS

TYPE	DESCRIPTION	CONNECTION
Input 1	input signal < 30 V	E/F + GND
Input 2	input signal < 300 V	A/C + GND

EXTERNAL INPUT

	DESCRIPTION	CONTROLS
EXT. 1	controlling input, its function is set in the menu (see. Menu > EXT.1)	upon contact, terminal (G + H)

①	Pitch	3,5 mm	5 mm
②	1,5 Nm *13.2 lb-in*	Ø 2,5 mm / *0.1 in*	Ø 3,5 mm / *0.14 in*
③	mm / *in*	mm / *in.* 6 / *0.24*	mm / *in.* 7,5 / *0.3*
	mm²/*AWG*	0,05...1,5/30...14	0,05...2,5/30...12

Note: Contactors, high power electric motors, frequency drives and other power devices should not be in a close proximity of the meter. Input signal leads (measured value) should be seperated from all power lines and power devices. Even though the meters has been designed and tested according to standards for industrial environment, we strongly advise to adhere to the above presented rules

3 Setting Instructions

Measuring type/mode selection

1. Switching the switch No. 2 into the **ON** position enters the programming mode - LED **Lo** lights up and LED **Hi** by its flashing, signals the type of measuring mode (table 1)
2. Measuring mode selection: LED **Lo** is green - By pressing the **Lo** button repeatedly you switch from one measuring mode to another and the LED **Hi** indicates, by its flashing, the actually selected mode (table 1)
3. Press button **Hi** to confirm the selected setting and go to the next menu item.

Table 1

LED LO ●		
LED HI	**Measuring mode**	
✳	SINGLE - COUNTER	Counter
✳✳	SINGLE - FREQUENCY	Frequency
✳✳✳	QVADR - COUNTER	Couter for IRC sensors
✳✳✳✳	QVADR - FREQUENCY	Frequency for IRC sensors
✳	UP/DW - COUNTER	UP/DW Counter, měří na vstupech A, C (směr)
✳✳	UP/DW - FREQUENCY	UP/DW Frequency, měří na vstupech A, C (směr)
✳✳✳	UP + DW - COUNTER	UP - DW Conter, měří na vstupech A (UP), C (DW)
✳✳✳✳	UP + DW - FREQUENCY	UP - DW Frequency, měří na vstupech A (UP), C (DW)
✳✳	TIME	Timer

4. Setting of type/level of inputs A and B - LED **Lo** is red - By pressing the **Lo** button repeatedly you switch from one menu item to another. LED **Hi** by its flashing, indicates the actually selected type/voltage level (table 2)
5. Press button **Hi** to confirm setting you selected and go to the next menu item (if available for the given type), otherwise go back to type.

Table 2

LED LO ●	
LED HI	**Type/Komparační úrovně**
✳	NPN - contact
✳✳	PNP - 4,5 V
✳✳✳	PNP - 10 V
✳✳✳✳	PNP - 15 V
✳	PNP - 20 V
✳✳	PNP - 25 V
✳✳✳	PNP - 30 V
✳✳✳✳	PNP - 35 V
✳✳	PNP - 40 V
✳✳✳✳	PNP - 45 V
✳✳✳✳✳✳	PNP - 50 V
✳✳✳✳✳✳✳	PNP - 55 V

6. Setting only for „TIME“ mode (controlling stopwatch) - LED **Lo** is off ○. By pressing the **Lo** button repeatedly you switch from one menu item to another. LED **Hi** ✳, by its flashing, indicates the actually selected option (table 3)

Table 3

LED LO ○		
LED HI	**Volba ovládání stopek**	
✳	CONTIN.	Timer/clock keeps running while the instrumentis on
✳✳	CONTAC.	Timer/clock keeps running while the external contact is on
✳✳✳	EDGE	Timer/clock is controlled by the edge of the measured signal - timer is activated by the edge (input signal exceeding comparative level) and deactivated by the next incoming edge
✳✳✳✳	RUN.ST.C.	Timer/clock is both controlled and zeroed by the edge of an activating signal - timer is activated by the edge (input signal exceeding comparative level) and both stopped and zeroed by the next incoming edge
✳	C.RUN.ST.	Timer/clock is both controlled and zeroed bythe edge of the activating signal - timer is zeroed ald launched by the edge of the input signal (input signal exceeding comparative level) and stops running when the second edge comes
✳✳	CLR.RUN.	Timer/clock is zeroed and launched by the edge of the activating signa
✳✳✳	CL.RU.RE.	Timer/clock is zeroed and launched by the edge of the activating signal. This cycle is repeated with every incoming edge
✳✳✳✳	START	Timer/clock is only launched by the edge of the activating signal

7. Setting only for „TIME“ mode (stopwatch resetting) - LED **Lo** flash in cycles ✳ By pressing the **Lo** button repeatedly you switch from one menu item to another. LED **Hi** ✳, by its flashing, indicates the actually selected option (table 4)
8. Setting of external input „EXT. 1“ - LED **Lo** is off ○ By pressing the **Lo** button repeatedly you switch from one menu item to another. LED **Hi** ✳, by its flashing, indicates the actually selected option (table 4).
9. Press button **Hi** to conform the selected setting and switch the switch No. 2 into its **OFF** position

Table 4

LED LO ○			
LED HI	**Funkce vstupů**		
	Input „B“	**Ext. 1**	**Function**
✳	CLEAR	STOP + CLEAR	Stopky/hodiny se vynulují
✳✳	STOP + CLEAR	CLEAR	Stopky/hodiny se zastavují i vynulují
✳✳✳	STOP	STOP + CLEAR	Stopky/hodiny se zastaví

Setting of Limits 1 (2)

1. After pressing button **Hi** (for Limit 2 it is button **Lo**) red LED **L.1** (**L.2**) starts flashing ✳ and both LED **Lo** and **Hi** flash in cycles ✳ ✳ ○
2. Set dipswitch no.2 (for Limit L.2 it is switch no.1) to **ON**, LED **Lo** an **Hi** flash in cycles ✳
3. On the OMX 333 input set the sinal to the level required for the Limit to be actuated
4. Select your setting by pressing the **Hi** button and switch the dipswitch no.2 to **OFF**

Setting of Analogue/Data output

1. By switching the dipswitch no.1 to **ON**  programming mode is accessed - LED **Hi** ● lights up and LED **Lo** ❋ signals the type of output by flashing (Table 5) or the rate of analogue output (Table 6)
2. By repeated pressing of button **Hi** the types of analogue output are accessed (rate) and LED **Lo** ❋ signals the the type of output (Table 5) or the rate of data output (Table 6)
3. By pressing **Lo** the selected setting is confirmed and a next menu item can be accessed (only for further setting of data output)
4. By repeated pressing of **Lo** button instrument's address can be set ang LED **Lo** ❋ signals by flashing the address of OMX 333 (Table 6), (this procedure only applies to setting of data output)
5. Our setting is confirmed by pressing **Lo** button and progarmming mode is exited by switching dipswitch no. **OFF** 

Table 5

LED HI ●	
LED LO	**ANALOGUE OUTPUT**
	TYPE
❋	0...2 V
❋❋	0...5 V
❋❋❋	0...10 V
❋❋❋❋	±10 V
❋	4...20 mA (Er)
❋❋	4...20 mA
❋❋❋	0...20 mA
❋❋❋❋	0...5 mA

Changing analogue output (AO) range

1. The converter is preset at the factory (0 = 4 mA, 50000 = 20 mA)
2. By switching dipswitches no.1 and no.2 to **ON**  programming mode is accessed - LED **Lo** and **Hi** flash alternatively ❋
3. To input terminals of OMX 333 connect signal of requested level which equals to minimum range of AO and by pressing **Lo** button this value is recorded, LED **Lo** ❋ flashes twice the normal rate
4. To input terminals of OMX 333 connect signal of requested level which equals to maximum range of AO and by pressing **Hi** button this value is recorded, LED **Hi** ❋ flashes twice the normal rate
5. By switching dipswitches no.1 and no.2 to **OFF**  programming mode is exitted

Table 6

LED HI	●	●	○
LED LO	**DATA OUTPUT**		
	Rate	**Address**	**Address PB**
❋	300	0	0
❋❋	600	1	1
❋❋❋	1200	2	2
❋❋❋❋	2400	3	3
❋	4800	4	4
❋❋	9600	5	5
❋❋❋	19200	6	6
❋❋❋❋	38400	7	7
❋❋	57600	8	8
❋❋❋❋	115200	9	9
❋❋❋❋❋❋	230400	10	10
❋❋❋❋❋❋❋		11	11

Restoration of manufacturer's /user settings

1. This is a good way how to return to the original manufacturer's setting especially when making a mistake during the set up process
2. By pressing buttons **Lo** and **Hi** simultaneously for approx 2 s LEDs **Lo** and **Hi** ❋
3. By switching dipswitches no. 1 and 2 to **ON**  the rate of flashing increases
4. By pressing button **Hi** restoration of manufacturer's setting is executed (linearisation table, if it had been entered, is deleted), by pressing button **Lo** restoration of user settings including those which had been set via OM Link SW is executed, (linearisation table remains)
5. By switching dipswitches no.1 and no.2 to **OFF**  this mode is exitted

Note: For an easier unit configuration we recommend using our free PC SW called OM Link and the OM Link-USB II connector cable www.merret.cz/en/products/software/om-link

Note: If there is a pause during configuration exceeding 60 seconds, the configuration mode closes down automatically and the device is switched into a measuring mode. In such case all unconfirmed selections will be lost.

Table 7

LED SYMBOL LEGEND	
○	LED is off
● / ●	LED is on
❋ / ❋	LED flashes
❋❋	LED flashes twice with a shotr pause
❋	LED cyklicky bliká zeleně a červeně

4 Error conditions

ERROR	LED **LO**	LED **HI**	CAUSE	ELIMINATION
E.d.U.		❋❋❋❋	number is too small (large negative) to be displayed	change DP setting, channel constant
E.d.O.		❋❋❋	number is too large to be displayed	change DP setting, channel constant
E.t.U.	❋❋		number is below the linearization table value; Error table underflow	change input signal value or linearization table
E.t.O.	❋		number is above the linearization table value; Error table overflow	change input signal value or linearization table
E.I.U.		❋❋❋❋	Input quantity is smaller than permitted input quantity rangey	change input signal value or input (range) setting
E.I.O.		❋	Input quantity is larger than permitted input quantity range	change input signal value or input (range) setting
E.HW.	❋❋	❋❋	a part of the instrument does not work properly	send the instrument for repair
E.E.E.	❋❋❋	❋❋❋	data in EEPROM corrupted	perform restoration of manufacture setting, upon repeated error statement send instrument for repair
E.d.t.	❋❋❋❋	❋❋❋❋	data v EEPROM mimo rozsah	perform restoration of manufacture setting, upon repeated error statement send instrument for repair
E.CL.	❋❋❋❋❋	❋❋❋❋❋	memory was empty (presetting carried out)	upon repeated error statement send instrument for repair, possible failure in calibration
E.In.		●	no input signal	check wiring
E.OU.	●		no output signal	check wiring

5 Menu structure when setting from PC using OM LINK program

PASSw. 0

inPUt

- CLEAr — Reseting: CL. Cnt • CL. tAr • CL. SUM
- CONFIG — SEt u: Setting intial counter value (0)
- MOdE: Selecting the instrument's measuring mode (S InGLE • 9UAdr• UPrdu • UP- du • t IME)
- n.tIME: Selecting time base (s) (05 • 10 • 50 • 100)
- FILtEr: Selecting digital filter (Hz) (OFF • 1000 • 100 • 40 • 5)
- nStArt: Selecting controls for Timer (COnt In • COntAC • EdGE ••• run)
- n.StOP: Selecting reseting for Timer (CLEAr • St.CLr. • StOP)
- tYPE A: Selecting type of input A (nPnCOn • PnP)
- LEvEL A: Selecting level of input A (24)
- tYPE b: Selecting type of input B (nPnCOn • PnP)
- LEvEL b: Selecting level of input B (24)
- POLAr: Selecting active edge or level (Lo 5 • HI r)
- bACKUP: Backup (YES • nO)
- EXt. In. / EXt. I: Selecting function of auxiliary input (OFF • HLd • tAr. • LOCK • CLEAr • CL. SUM. • CLrSt)

CHAnnE

- CH.Cnt
  - SEt. C
    - SCAL.C: Setting multiplication constant - channel counter (1)
    - div.C: Setting division constant - channel counter (1)
    - OFF.C: Setting additive constant - PRESET, channel counter (0)
  - FILtEr
    - MOd.FC: Setting digital filters - channel counter (nO • EXPOn • rOUnd • IrH)
    - COn.FC: Setting filtration constant (0)
  - FOrM.C: Selecting projection format - for mode Time (HHMMM • HHMSS • 99MSS • HMM • MSSCC • 99SCC)
- CH.Fr
  - SEt.Fr
    - SCAL.F: Setting multiplication constant - channel frequency (1)
    - div.F: Setting division constant - channel frequency (1)
    - OFF.F: Setting additive constant, channel frequency (0)
  - FILtEr
    - MOd.FF: Setting digital filters - channel frequency (nO • EXPOn • rOUnd • IrFr.)
    - COn.FF: Setting filtration constant (0)

OUtPUt

- LIM
  - L.1
    - inP.L.1: Setting of input value for evaluation Setting of (Cnt • Fr.)
    - MOd.L.1: Limit mode** (HYStEr. • C-PULS. • OnCE)
    - tYP.L.1: Setting input type*** (CLO • OPE.)
    - LIM.L.1: Setting of limit value (25)
    - HYSt.1: Setting of limit hysteresis (0)
    - tIM.L.1: Setting of limit time delay (0)
  - L.2
- dAtA
  - bAUd: Setting of baud rate (600 • 1200 • 2400 ••• 115200 • 230400)
  - Addr: Address setting (0)
- An.OUt
  - inP.AO: Selection of input value to be processed as AO (Cnt • Fr.)
  - tYP.AO: Selection of output signal type (0..20 • 4..20 • 0..5 • 0..2 • 0..5 • 0..10)
  - MIn.AO: Setting minimum for analogue output (0)
  - MAX.AO: Setting maximum for analogue output (100)
- dISPL
  - inP.d: Setting input values for projection (for RS - OM Link) (Cnt • Fr.)

SErvICE

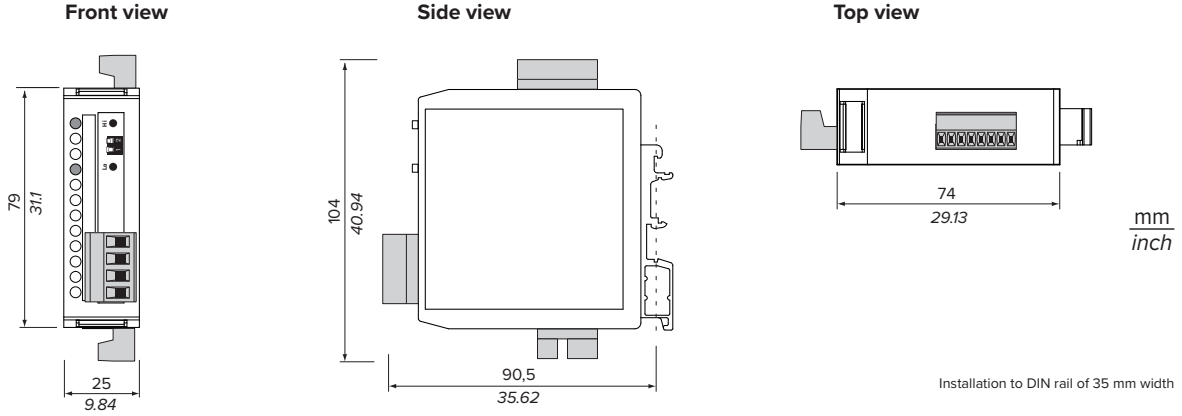
- rESEtOr: Restor. manufacturer'settings — FACtO. (YES) / USEr
- SAvE
- n.PAS: Setting access passwords — PAS.L.1. (0) / PAS.Pr.

*Setting digital filters
OFF filters are off
EXP. exponential filter
rnd. rouding
COn. setting of the calibration const.

**Setting of limit mode
HYSTER. range/hysteresis/delay
C.-PULS. resets counter when a pre-set value is reached. A pulse of a predefined length (TIM. L.1) is generated.
ONCE Activates limits when a pre-set value is reached (only once). To repeat the action, reset is needed.
ON RUN Relay is activated when stopwatch is running (only for MOD. L.2)

***Setting input type
CLO. SPST-NO (form A)
OPE. SPST-NC (form B)

6 Instrument dimensions and installation



Installation to DIN rail of 35 mm width

7 Technical data

INPUT

Number of inputs	2
Range	on contact, TTL, NPN/PNP 0...30 / 300 V, comparative levels are adjustable in the menu (9,7 / 14,4 / 19,2 / 23,9 / 28,7 / 33,5 / 38,3 V) or automatic
Measuring mode	Counter/Frequency UP or DOWN Couter/Frequency UP/DOWN Counter/Frequency for IRC sensor Timer/Clock 0,1...50 kHz (Mode SINGLE) 0,1...20 kHz (Mode UP/DW) 0,1...20 kHz (Mode UP-DW) 0,1...20 kHz (Mode QUADR. - Frequency) 0,1...10 kHz (Mode QUADR. - Counter)

INSTRUMENT ACCURACY

TC	50 ppm/°C
Accuracy	±0,1 % of the range
Time base	0,5 / 1 / 5 / 10 s
Multip. constant	±0,00001...999999
Division constant	±0,00001...999999
Filtration constant	enables the user to select maximum valid frequency, which is processed (OFF/5/40/100/1000 Hz)
Digital filtres	exponencialn filter, rounding, 1/frequency, measuring only completed revolutions (division constant)
External inputs	1, with the possibility of assigning various functions in the instrument's menu

Overload capacity	2x
Linearisation	linear interpolation in 50 points (only via OM Link)
OM Link	company communication interface for operation, setting and update of instruments
Watch-dog	reset after 500 ms
Calibration	at 25°C and 40 % r.h.

COMPARATOR

Type	digital, setting in v menu
Limits	±999999
Hysteresis	±999999
Delay	0...99,9 s
Mode	**Hysteresis** setpoint, band of hysteresis „Setpoint ±1/2 Hys." and time defining the time-delay after which the relay will be activated **C-Puls** automatic reset of counter when a pre-set value is reached **Once** Setpoint, limit will be activated when the counter is reset **On Run** Relay is activated when stopwatch is running
Output	2x relays with switch-on contact (Form A), (250 VAC/30 VDC, 3 A)* 2x open collector, (30 VDC/100 mA)*
Reaction speed	< 50 ms
Relays	1/8 HP 277 VAC, 1/10 HP 125 V, Duty D300

* hodnoty platí pro odporovou zátěž

DATA OUTPUT

Protocol	ASCII
Data format	8 bit + no parity + 1 stop bit
Rate	600...230 400 Baud
RS 485	isolated, adressing (max. 31 instruments)

ANALOG OUTPUT

Typ	isolated, programmable with 16-bit D/A converter, type and range are selectable in menu
Non-linearity	0,1 % of range
TC	15 ppm/°C
Rate	response to change of value < 1 ms
Output	0...2/5/10 V, ±10 V, 0...5 mA, 0/4...20 mA (comp. < 500 Ω/12 V), Detection of broken loop (3,6 mA)
Ripple	5 mV residual ripple at output voltage of 10 V

POWER SUPPLY

Power	12...30 VDC/24 VAC, ±10 %, 2 VA, PF≥ 0,4, I_{STP}< 40 A/1 ms, non-isolated 10...30 VDC/24 VAC, ±10 %, 2 VA, PF≥ 0,4, I_{STP}< 40 A/1 ms, isolated

MECHANIC PROPERTIES

Material	PA66, incombustible UL 94 V-0, blue
Dimensions	90,5 x 79 x 25 mm
Installation	on DIN rail, width 35 mm

OPERATING CONDITIONS

Connection	connector terminal blocks, section < 1,5/2,5 mm²
Stabilization period	within 5 minutes after switch-on
Working temp.	-20°...60°C
Storage temp.	-20°...85°C
Protection	IP20
Construction	safety class I
El. safety	EN 61010-1, A2
Dielectric strength	2,5 kVAC after 1 min. between power and input 2,5 kVAC after 1 min. between input and output 4 kVAC after 1 min. between input and relays
Insulation resist.*	for pollution degree II, measurement cat. III power supply > 300 V (ZI), 255 V (DI) input/output > 300 V (ZI) input/output - relé > 300 V (DI)
EMC	EN 61326-1 (Průmyslová oblast)

* ZI - Základní izolace, DI - Dvojitá izolace

Measuring instruments of the OMX 333 series conform to the European regulation 2014/30/EU and 2014/35/EU

This product must be installed, connected and used in compliance with prevailing standards and/or installation regulations.
As standards, specifications and designs develop from time to time, always ask for confirmation of the information given in this publication.

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