

# **MULTIFUNCTION MINI COUNTER OC1135**

## **Operator's Manual**

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## Vor dem Einschalten

Überzeugen Sie sich, ob Ihre Sendung das richtige Gerät Orbit Controls Modell OC 1135 beinhaltet, einschliesslich einer Betriebsanleitung OC 1135.

Vor dem Einschalten des Gerätes überprüfen Sie die Anschlüsse und die Versorgungsspannung. Ein falsch angeschlossenes Gerät kann beschädigt werden und damit auch die mitverbundene Folgeelektronik. Für falsche Handhabung wird jede Haftung abgelehnt.

### ZU BEACHTEN

*Dieses Gerät wurde sorgfältig verpackt. Falls es bei Ihnen in beschädigtem Zustand eintrifft, benachrichtigen Sie unverzüglich den Orbit Controls Kundendienst (Tel: +41 1 730 2753 oder Fax: +41 1 730 2783) und nehmen Sie einen Schadenrapport auf, welchen Sie auch von der Transportgesellschaft unterschreiben lassen. Bewahren Sie bitte das Verpackungsmaterial für eventuelle Reklamationen auf.*

## Unpacking Instructions

Remove the Packing List and verify that you have received all equipment, including the following:  
Orbit Controls Model OC 1135 Programmable Counter.

Operator's Manual OC 1135.

If you have any questions about the shipment, please call the Orbit Controls Customer Service Department.

### NOTE

*When you receive the shipment, inspect the container and equipment for signs of damage. Note any evidence of rough handling in transit. Immediately report any damage to the Orbit Controls customer service, Phone +411 730 2753 or Fax +411 730 2783 and to the shipping agent. The carrier will not honour damage claims unless all shipping material is saved for inspection. After examining and removing contents, save packing material and carton in event the reshipment is necessary.*

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# PROGRAMMABLE MULTIFUNCTION COUNTER OC1135

- ✓ **Quadrature Counter**
- ✓ **Tachometer – Frequency Counter**
- ✓ **0.01 Hz-100 kHz Frequency Measurement**
- ✓ **Free Scalable Display**
- ✓ **Parameter Memory**
- ✓ **Two Set Point Outputs**
- ✓ **Last Reading Memory**



**Model OC1135** is a 5 digit Counter with programmable functions for Quadrature Counter, Up-Down Counter and Frequency Counter-Tachometer. The instrument is designed for industrial applications for connection to incremental resolvers, inductive and optical sensors and other electric signals. With three keys at the front the menu can be opened. The menu contains Scaling, Preset, Filter, Sampling Time, Reset Time, Password and two Set Points. The Counter function can be set for Quadrature Counter, Up-Down Counter or Tachometer.

**Quadrature Counter** requires two 90° phase shifted Signals A and B from linear or revolving incremental resolvers. The counting direction is automatically recognized from the phase of the input signals. The counter is designed for measuring and positioning applications. The display increments all edges of the input signals.

**Up-Down Counter** is designed for bidirectional counting applications. The input pulses are connected to the input A, the logic level at the input B determines the counting direction. Additional mode is programmable, in which the counter counts up when the pulses are applied to the input A and counts down when they are connected to the input B.

**Tachometer – Frequency Counter** is suitable for measurements of revolutions, speed and other dynamic frequency based applications. The display can be scaled in required process units. By using two signal inputs from incremental resolvers, the display can measure bidirectional speed or revolutions. The measuring time can be set from 0.3 sec to 160 sec. The reset time determines the measurement of the lowest possible frequency. This time can be set up to 360 seconds, which determines the lowest frequency of 0.003Hz.

*Floating Point Arithmetic* permits practically unlimited display capacity. The pre-programmed decimal point is automatically positioned when the maximum display capacity is achieved. When during the counting period the display arrives at its full capacity with the decimal point after the last significant digit, the display shows the overload by **UnDEF**.

*Preset* of full 5 digits with decimal point and sign can be selected and entered into the display. The display starts counting at the Preset.

*Scale* of the display can be achieved with multiplication and division. The multiplicative constant can be programmed in full 5 digits with decimal point and sign. The dividing constant is programmable from :1 to :99999. The scale permits the readings in required process units such as mm, inches, LPM, m/sec etc.

*Averaging Filter* has programmable constants from 1 to 99. It can be used for noisy signals, disturbed environments or when the resolver delivers noisy signal due to vibrations.

*Last Display Reading* remains memorized when the power is switched-off. The display starts to count at the memorized last reading when the power is switched-on again.

OC1135 is supplied from DC voltage and enclosed in DIN 24 x 48mm cabinet. The connections are with pluggable screw terminals.

## 1 FRONT PANEL



The key **MENU** opens the program menu. The required parameter will be confirmed with **ACK**. The parameter magnitude will be set with **ACK** or **SET**.

The flashing digit - Cursor – can be positioned with **ACK**. The Sign and the Decimal Point can be set first after the cursor is positioned out of the display range and no digit is flashing. With the **SET** the decimal point and the sign will be set. The programming is terminated with the key **SET** and the display returns to the measuring mode.

## 2 MODES OF OPERATION

The counter permits three modes of operation:

### Quadrature Counter (Menu Steps QUAd and Udic)

The instrument permits connection to resolvers or measuring lineals with two 90° phase shifted signals A, B and zero reset. The display counts with each edge of the signals A and B, thus multiplying the resolution by 4. The display increments or decrements within the entire range -99999 ... 99999. The Up or Down counting is automatically determined by the phase shift of pulses A and B.

### UP-DOWN Counter (Menu Steps Udic and Count)

The pulses to be counted are at the input A whereas the logic level at the input B determines the counting direction.

UP: B = 0 or open

DOWN: B = 1 (5V ... 28V)

### Frequency Counter – Tachometer (Menu Steps Udic and tAcho)

The counting pulses are at the input A. The display shows the frequency. By using the scaling facilities, the display can be used for tachometry, showing RPM, speed or other frequency depending function.

The logic level at the input B determines the sign:

Positive Sign: B = 0 or open

Negative Sign: B = 1 (5V ... 28V)

### 3 MENU

#### 3.1 MENU STEPS

Key	Display	Function
MENU	PASS	Correct Password permits entry into the menu
ACK	P 1001	Confirm and set with ACK and/or SET
MENU	SP 1	Set Point 1, isolated transistor output
ACK	XXXXX	Select with ACK and SET
MENU	HSt 1	Hysteresis SP1.
ACK	XXXXX	Select with ACK and SET
MENU	Fnr1 1	Function of the output
ACK	OPEn	OPEN or CLOSED, select with ACK and SET
MENU	SP 2	Set Point 2, isolated transistor output
ACK	XXXXX	Select with ACK and SET
MENU	HSt 2	Hysteresis SP2.
ACK	XXXXX	Select with ACK and SET
MENU	Fnr1 1	Function of the output
ACK	OPEn	OPEN or CLOSED, select with ACK and SET
MENU	PrESE	5 digit additive constant - Offset - with decimal point and sign
MENU	SCALE	5 digit multiplicative constant with decimal point and sign
MENU	dSCALE	Dividing constant selectable from :1 to :99999.
MENU	OrdEr	Decimal point selection from X.XXXX to XXXXX.
MENU	qUA-U	Measuring mode
ACK	Ud ic	Select with ACK and SET between Ud ic and qUAd Ud ic = UP/DOWN Counter or Tachometer (see further selection) qUAd = Quadrature Counter (see further selection)
MENU	Cn-tA	Select with ACK and SET between UP/DOWN Counter and Tachometer
ACK	tAcho	Select with ACK and SET between tAcho and Count

*By selecting the Tachometer tAcho the display shows additional menu steps:*

MENU	FbASE	Tachometer Time Base (Measuring Time in Seconds) Select with ACK and SET: OFF, 0.22, 0.45, 0.90, 1.8, 3.6, 7.2, 15, 30, 60, 120 <i>The selection OFF is the maximum speed determined by the microcontroller.</i>
MENU	ObASE	Tachometer-Reset Time (in Seconds) Select with ACK and SET: OFF, 0.22, 0.45, 0.90, 1.8, 3.6, 7.2, 15, 30, 60, 120 <i>ObASE determines the Reset Time after which the display will set to zero with no pulses at the input. This has to be considered at low frequency measurements where the ObASE value has to be set accordingly.</i>

**IMPORTANT:** *The reset time ObASE has always be set at least one step higher than the selected measuring time FbASE. Measurements of low frequencies require the ObASE value enough long to prevent the counter not to be reset between two consecutive pulses.*

MENU	Filt	Filter Constant: OFF, FIL 1, FIL 2, ... FIL 99.
MENU	SPASS	Setting of the Password from 20 possible combinations memorized.
MENU	StArt	Start of the measuring mode.

The key SET terminates the programming mode and starts the measurement. If pressed during the measuring mode, the display will reset to zero or will be set to the value programmed in the menu step PrESE.

## 4 SCALE and dSCALE

The input frequency can be scaled to the required reading at the display by the multiplying and the dividing free programmable constants:

SCALE            Multiplicative constant  
dSCALE        Dividing constant of the SCALE.

$$\text{Display} = \text{Input} \times \text{Scale} : \text{dSCALE} + \text{PrESE}$$

### 4.1 EXAMPLE – QUADRATURE COUNTER

**Task:** A resolver with 14400 pulses/revolution is used. The display has to show 2.000 after one revolution.

**Solution:** Set **quAd** in the menu.

SCALE Calculation:         $2.000 : 14400 = 0.000138888 = 1.38888 : 10000$   
SCALE Selection:        1.3888 adjust in Menu Step *SCALE*  
SCALE Division:        Select 10000 in Menu Step *dSCALE*  
Decimal Point:        Select CC.ddd in Menu Step *OrdEr*

Terminate with the key **SET**.

## 5 H-TEST and CALIBRATION

Service and calibration Submenu is available. To enter it, press the key MENU during power-on and hold it pressed until the display shows **HtESt**.

The key **MENU** advances the test. The display segments will be tested, the Set Points SP1 and SP2 activated and the frequency calibrating constant **CL** can be set. The **HtESt** can be terminated only by switching-off the supply.

**Calibrating Constant CL:** This is a correction constant selectable from -99 to 99. The number at the display increases as long as the key MENU is kept pressed. When at the same time also the key ACK is pressed, the number starts decrementing. The CL value of 10 corresponds approx. to 2 increments of the least significant display digit.

## 6 SPECIFICATIONS

DISPLAY:	0 ... ± 99999, red, 7 segments, 8 mm.		
INPUTS:	<b>Inputs A, B, Z:</b>	Positive logic 5V CMOS, protected to 28V.	
	Frequency Range:	0 ...100 kHz.	
	<u>Quadrature Counter:</u>	Inputs A and B, Reset Input Z. The counting direction is automatically determined bat he phase shift between signals A and B. The display increments with each signal edge A and B.	
	<u>UP-DOWN Counter:</u>	Input A:	Pulses to be counted
		Input B:	Counting direction UP (log. 0 or open)
			Counting direction DOWN (log.1)
	<u>Tachometer:</u>	Frequency measurement from 0.01 Hz to 100 kHz	
		Accuracy:	0.05% from value
OUTPUTS:	Set Point SP1 and SP2, two isolated open collector outputs (Optocoupler Type PC357). Maximum switching values: 35V and 30mA. The both emitters are internally tied to the (-) terminal of the supply.		
PRESET:	Additive display constant programmable from 0 to ± 9.9.9.9.9. The Preset can be entered into the display with the key <b>SET</b> or with external log. Signal at the terminal <b>Z</b> . When the value is set to Zero, the display will reset to 00000.		
SCALE:	<b>SCALE:</b> 5 digit multiplicative constant with decimal point and sign <b>dSCALE:</b> Dividing constant selectable from :1 to :99999.		
SAMPLING TIME:	<b>FbASE:</b> Measuring Time (Tacho-Frequency measurements) programmable from OFF, 0.22 to 120 Sec. <b>ObASE:</b> Reset Time (Tacho-Frequency measurements) programmable from OFF, 0.22 to 120 Sec.		
RTESOLUTION:	<b>OrdEr:</b> Selection of the display resolution, decimal point of the floating arithmetic.		
FILTER:	<b>FILtER:</b> Average Filter with programmable constants OFF, 1 ... 99.		
SUPPLY:	24VDC ± 10%, 2W. Option: 9 - 36 V DC, 3 W.		
CABINET:	DIN 24x48 mm, depth behind the front is 65 mm. Panel cut-out 21x42 mm.		
TERMINALS:	Pluggable screw terminals.		

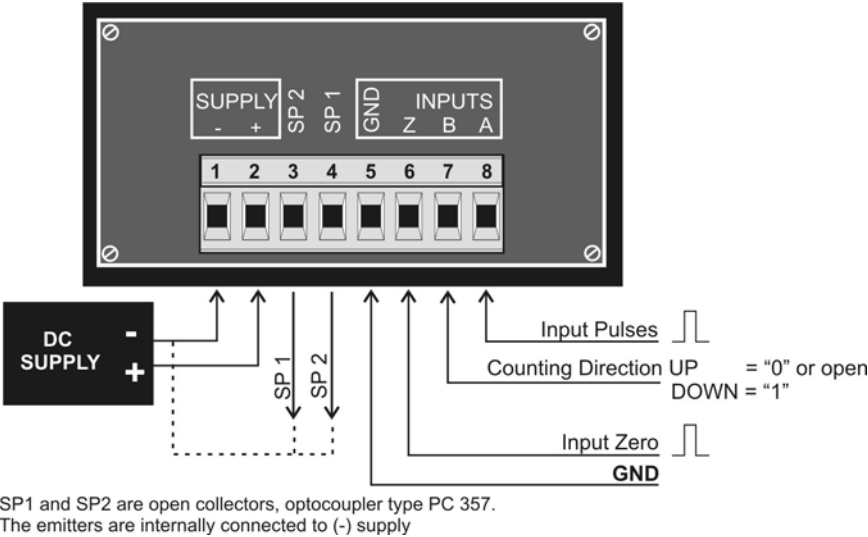
## 7 PRESET and RESET

Programmed as a Quadrature counter **quAd** or Up/Down Counter **Udic** the Preset can be entered into the display forcing the display to start counting at this value. The selected value in the menu Step PrESE can be inserted into the display with the key SET or with external control signal at the input Z. By selecting 00000 the display will reset to Zero.

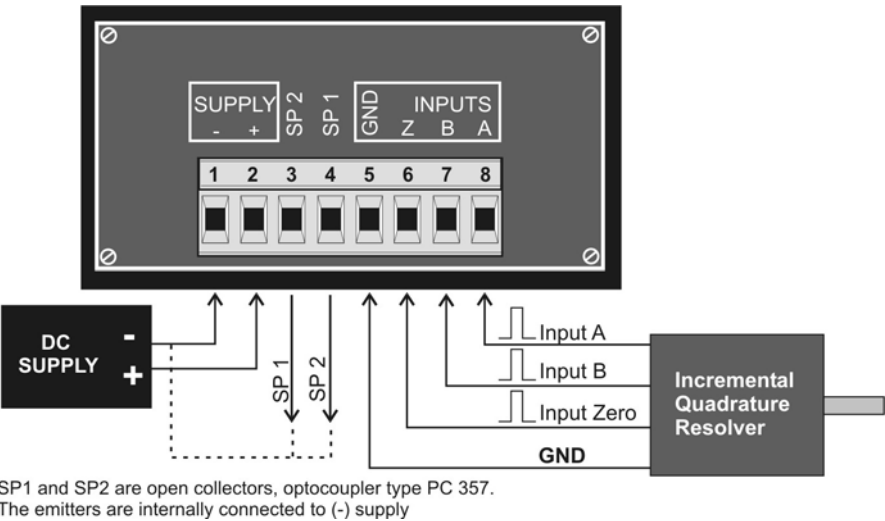


8 OC1135 TERMINALS

8.1 Up-Down Counter and Tachometer



8.2 Quadrature Counter connected to a Resolver



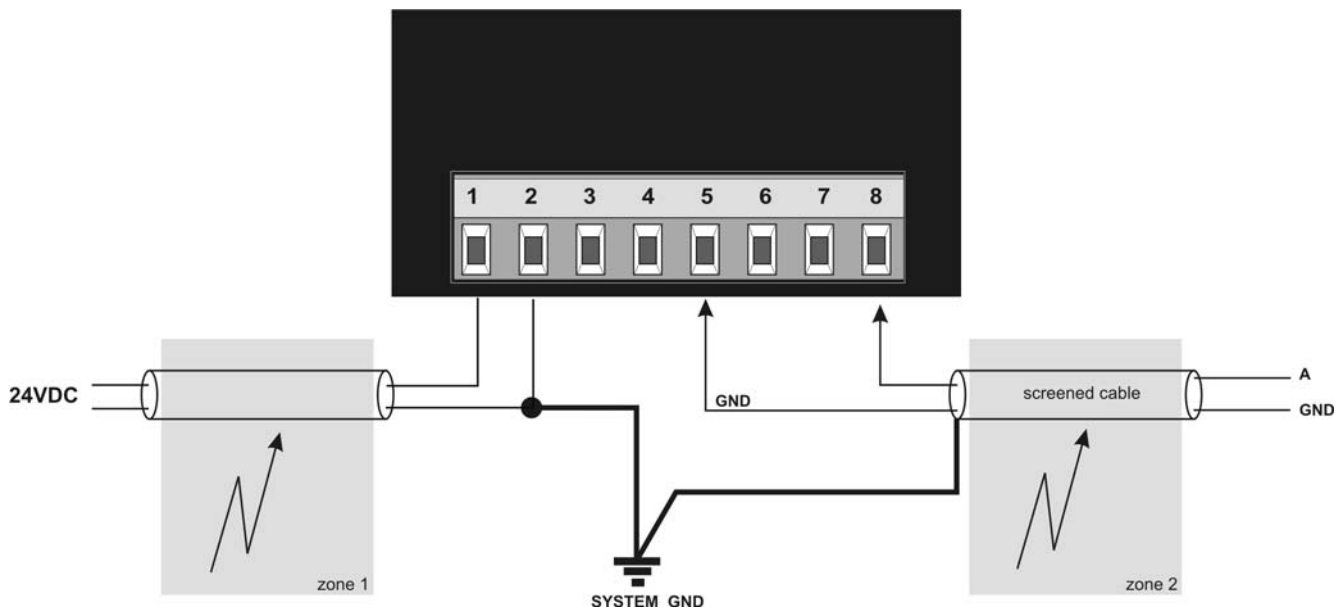
## 9 BURST TEST and recommended CONNECTIONS

**Tester:** Burst-Surge Generator HILO, Model CE-Tester  
**Date:** 21. August 2005  
**E.U.T.:** OC1135 SN: 00001 Supply 24VDC  
 Mode: Tachometer, Frequency Counter, *SCALE* = 1, *dSCALE* = 1  
 Input: 10000 Hz, 5V TTL  
 Display: 10000

### 9.1 Conditions

Norms: IEC 801-4  
 IEC 1000-4-4  
 EN 50052-1

### 9.2 Test Set - Up



### 9.3 Test Results

Zone 1:	2kV Burst	Display 10000 without any change
Zone 2:	2kV Burst	Display 10000 without any change
Zones 1 and 2:	2kV Burst	Display 10000 without any change

Technician: Andrea Moncada 21. August 2005