

User Manual

ROTACAM ASR58

Description

ROTACAM is an absolute encoder purposely designed to produce electrical phase signals that are necessary for the working of any automatic machine.

Instead of using special or adjustable mechanical cams to drive micro switches or proximity switches, the ON/OFF switching points are programmed via software by a PC in correspondence of the desired angles.

The reliability of correct working is warranted by a microprocessor of advanced conception that permits to memorize up to 16 different programs that can contain 1920 cams.



Chapters

- 1 Safety summary
- 2 Identification
- 3 Installation
- 4 Electrical connections
- 5 Setup
- 6 Programming software

1 - Safety summary

Safety

- observe the professional safety and accident prevention regulations applicable to your country during device installation and operation;
- installation has to be carried out by qualified personnel only, without power supply and stationary shaft;
- the encoder must be used only for the purpose appropriate to its design;
- high current, voltage and rotating parts can cause serious or fatal injury.

Electrical safety

- switch OFF the voltage before connecting the device;
- connect according to the chapter 5: "Electrical connections";
- according to the 89/336/CEE norm on electromagnetic compatibility, following precautions must be taken:
 - before handling and installing, discharge electrical charge from your body and tools which may come in touch with the device;
 - power supply must be stable without noise, install EMC filters on device power supply if needed;
 - always use shielded and twisted cables if possible;
 - avoid cables runs longer than necessary;
 - avoid running the signal cable near high voltage power cables;
 - mount the device as far as possible from any capacitive or inductive noise source, shield the device from noise source if needed;
 - minimize noise by connecting shield or connector housing to ground (GND). Make sure that ground (GND) is not affected by noise. The shield connection point to ground can be situated both on the device side and on user's side. The best solution to minimize the interference must be carried out by the user.



Mechanical safety

- solid shaft: use a flexible coupling to connect encoder to motor shaft respecting the coupling misalignment tolerances;
- do not disassemble the encoder;
- do not tool the encoder or its shaft;
- do not subject the encoder and the shaft to knocks or shocks;
- respect the environmental characteristics of the product.

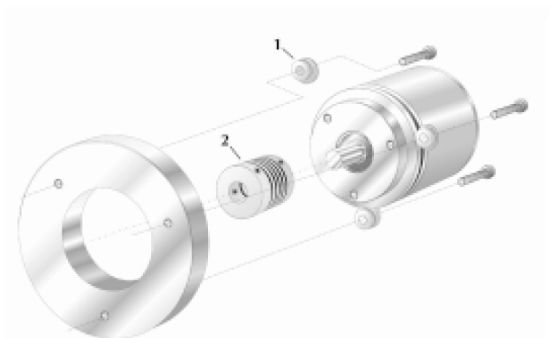
2 - Identification

The device can be identified by the label's data (ordering code, serial number). This information is listed in the delivery document. For technical features of the product, refer to the technical catalogue.

3 - Installation

Install the device according to the provided protection level. Protect the system against knocks, friction, solvents and respect the environmental characteristics of the unit.

3.1 Assembly instructions



Install the encoder with fixing clamps (ordering code LKM 386):

- (1) fixing clamps kit, supplied with screws
- (2) flexible coupling

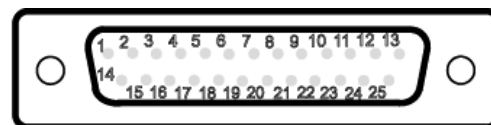
In order to guarantee the maximum life of the mechanical parts of the encoder, we recommend to use a flexible coupling between the encoder and the motor shaft.

IMPORTANT:

You are strongly advised not to carry out any mechanical operations (drilling, milling, etc.) on the encoder's shaft. This could cause serious damages to the internal parts and the immediate warranty loss.

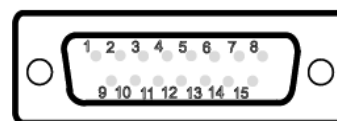
4 - Electrical connection

DSub 25 pin connector pin-out:



Pin	Function	Pin	Function
1	Out 1	14	Out 14
2	Out 2	15	Out 15
3	Out 3	16	Out 16
4	Out 4	17	Load Prg
5	Out 5	18	Sel. Prg.2 ⁰
6	Out 6	19	Sel. Prg.2 ¹
7	Out 7	20	Sel. Prg.2 ²
8	Out 8	21	Sel. Prg.2 ³
9	Out 9	22	Zero Setting
10	Out 10	23	Complementary
11	Out 11	24	+10Vdc +30Vdc
12	Out 12	25	0 Vdc
13	Out 13		

DSub 15 pin connector pin-out:



Pin	Function	Pin	Function
1	n.c.	9	n.c.
2	n.c.	10	n.c.
3	n.c.	11	GND
4	Analogue output*	12	RxD (RS232)
5	Speed	13	TxD (RS232)
6	GND	14	+10Vdc +30Vdc
7	Fault	15	0 Vdc
8	GND (RS232)		

n.c. = Not connected

* option

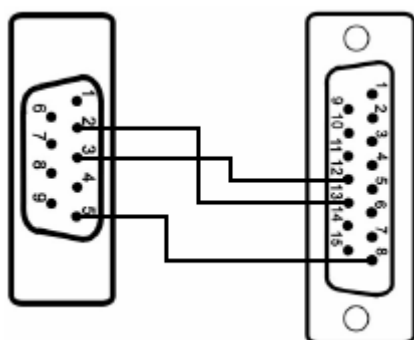
NOTE:

- Power supplies of both connectors (pin 14 + 15 and respectively 24 + 25) are connected together.
- Program selection inputs (pin 18, 19, 20 and 21) are internally connected to GND with pull down resistances.
- GND (RS232) is not connected to 0Vdc.

4.1 RS232 serial interface

An application software for encoder setup with RS232 interface (pin 8, 12, 13 of DSub 15 pin connector) is available on the web site www.lika.biz > **products** > **rotary transducers** > **absolute encoders**.

PC	ASR58
pin 2	pin 13
pin 3	pin 12
pin 5	pin 8



Make sure that RxD of the PC is connected to the TxD of the device and that TxD of the PC is connected to the RxD of the device.

Technical data:

Function	Data
Baud rate	9600
Data bits	8
Parity bit	No
Stop bit	1
Flow control	No

5 - Setup

5.1 Parameter description

Load Prg Load program

Permits to load the selected program. Bring the signal Load Prg (PIN 17) to GND for at least 10 ms. The program will be automatically loaded at ignition.

Sel. Prg. 2* Select program

You can select the program using a binary code of 4 PIN (18, 19, 20, 21). See the example below: code for the selection of program n° 5:

PIN	21	20	19	18	
Value	2^3	2^2	2^1	2^0	
Binary	0	1	0	0	= 4

Program n°5 = Binary code + 1.

Zero Setting

The output value is set to zero (reset) by a signal of PLC or other device. The reset signal (PIN 22) must be at logical level HIGH from +10Vdc to +30Vdc for 100 μ s minimum.

ATTENTION:

The zero setting command modifies only the position value of the single program in use (not those of the other 15).

Complementary Counting direction

Allows the anticlockwise counting of the encoder. Connect PIN 23 with PIN 24 (+10Vdc +30Vdc).

Analogue output

The analogue output in voltage is optional (PIN 4). On request we supply following ranges:

0 Vdc ÷ +10Vdc

0 Vdc ÷ +5Vdc

-5Vdc ÷ +5Vdc

To activate the analogue output it is necessary to program one and just one cam in the output n° 1.

Speed Speed sensing signal.

Square wave 1800 PPR for speed survey.

Fault State of outputs

The fault signal (PIN 7) indicates the state of the 16 outputs. State ON indicates that:

- the encoder is receiving the program
- the selected program is loading in EPROM
- the selected program does not exist.

RxD, TxD (RS232)

Opto-insulated serial gate RS232 for the programming and display by PC.

5.2 Accessories

- Programming software.
- External AC/DC power supply used to give voltage to the encoder during the programming on PC.
- Hand held programmable terminal in order to modify the programs stored in the encoder without taking down the encoder from the machine and without need of a PC.

5.3 Reading position through RS232

To read actual value send the following message:

Byte	Value
0	128
1... 17	0
18	CHK

The encoder will reply with a message of 19 bytes:

Byte	Value
0	128
1	0
2	LSB of actual position
3	MSB of actual position
4	n° of active program
5	n° of programmed cam
6... 7	0
8	LSB output pattern
9	MSB output pattern
10... 17	0
18	CHK

CHK Checksum

Byte used for the control of the correct message transmission. The CHK value is the unsigned sum of bytes 0-17.

6 - Programming software

6.1 PC - encoder connection

Connect according to the chapter 4: "Electrical connections".

6.2 Software installation

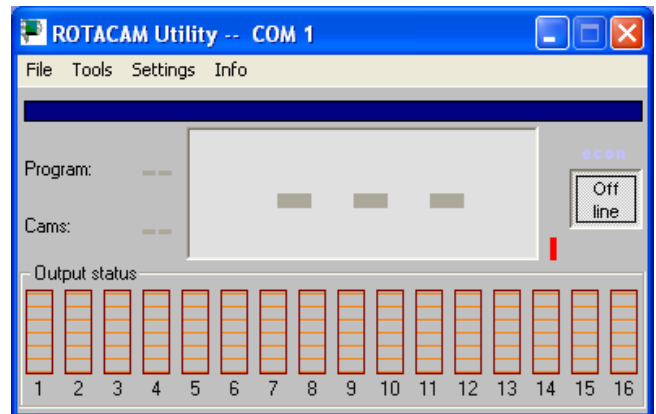
Before installing the utility software, close any other application and uninstall the old versions.

To install the software click twice on "Setup.exe".

The procedure will ask you, where to save the application.

Copy the example files (*.txt) from program directory (C:\program\Rotacam) to work directory (C:\Lika\rotacam).

6.3 Main window



"Off line" button is used to stop serial communications and release serial gates for other applications.

The position, the active output (output status), the program in use and the cams programming are visualized in the main window.

Between the "Off line" button and the position edit there is a vertical bar that shows the quality of communication, when it is green it means the communication is good, if the bar changes its color (yellow or red) it means that there are some problems in the serial communication (cable too long, noise, etc.).

If the visualization is intermittent, try to change **Filter** parameter (see next chapter).

If there is no communication, the vertical bar will be red and the position edit will display dashes.

The serial gate in use is highlighted on the title bar. If you reduce the main window to icon, the position is visualized on the application bar.

6.3.1 Tools menu

Programming

It opens the window used to manage, transmit and modify the encoder programs.

6.3.2 Settings menu

Model

Select the ASR encoder model connected to the PC. The standard encoder is ASR58, but the software can work with the old ASR6 encoder and other special devices.

The utility software changes some of its characteristics in function of the selected model.

Language

Select the language of the menu bar, buttons and diagnostic messages.

COM gate setting

Select the COM gate of the PC connected to the encoder. Modify the advanced setting of COM gate pushing "Advanced" button.

Filter

It increases the "timeout" if long cables or special encoders are used. It has to be activated in case of communication problems (position flash, red vertical bar, etc.). When the filter is set on "x10" or "x100" all functions slow down. In this case, also the updating of the position value becomes slowly.

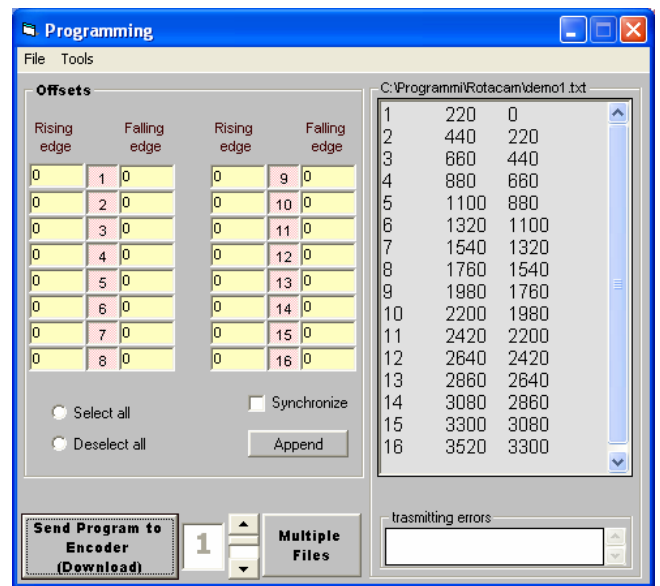
For ASR58 and ASR6 encoders default value is "x1", for S568 it is "x100".

Enable ECON

Procedure used to save energy and PC resources.

If the position value doesn't change for 2 minutes, the ECON procedure is displayed with a string and the serial gate is used every 2 second. If the position value changes, ECON procedure "wakes up" the utility software.

6.4 Programming window



The buttons from 1 to 16 (one for each output) in **Offsets** panel are used to enable or disable the offset values. The offset values are written on the left side (rising edge) and on the right side (falling edge) of the box. The enabled values will be calculated and applied to the program sent to the encoder.

To view all the messages sent to the encoder, extend the programming window, if "ok" appears at the end of each line, it means that the encoder has received the message.

Select all, Deselect all

Select or deselect at the same time all the 16 buttons.

Synchronize

This function allows to update the offset panel following the program data.

Append

Adds the offset values at the end of the program.

NOTE:

It is important to know that the offsets used by the encoder are only those written and activated on the Offsets panel.

The offsets put into the program are considered only if the **synchronize** checkbox is selected.

Send Program to Encoder (Download)

Sends the visualized program with the activated offsets to the encoder. The file is placed in the program number displayed on the right side of the button.

Multiple Files

This button is used to manage 16 files simultaneously. On each line you can indicate the path where the file is, otherwise you can click on the line number and open the PC resource window to search for the desired file.

Clicking on the **Send Program** button, every listed file is sent to the encoder and placed in the corresponding program number.

As explained in the next chapter, a whole file list can be saved or read from PC memory.

6.4.1 File menu

Load Progr., Save Progr.

Loads from PC memory or saves to PC memory one program (*.txt).

Load List, Save List

Loads from PC memory or saves to PC memory a list of programs (*.lis).

Import (from MAINGR)

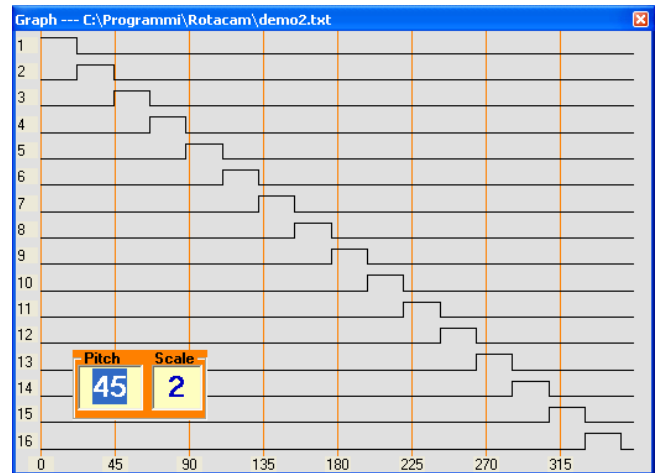
This function is used to recover old files of old utility software. In old files, there may be more than one program, now those programs are divided and a new list is created.

In the previous software the "Offset" values were called "advance" and had inverted algebraic signs.

There is the possibility to recover old files without losing data.

6.4.2 Tools menu

Graphic display



This function opens a new window where the 16 already programmed and on PC activated outputs are displayed.

Clicking with the mouse on the Graph window, it is possible to change the Pitch of vertical reference bar (from 10 to 359 degrees) and change the Scale of the window (from 1 to 4). These values are stored on PC memory.

6.5 Work files

The files to send to Rotacam can be written with any text editor. Pay attention not to include formatting commands and types.

Every line has to contain the complete command of one output: **output number** (from 1 to 16), **rising edge** and **falling edge**. The edge values have to be written in 1/10 degree.

Each output can be set with multiple command lines.

Example:

To set output 7:

rising edge of 198.5° and falling edge of 300,0° ,
rising edge of 350,0° and falling edge of 355,0°:

7	1985	3000
7	3500	3550

Between the output number and the edge value insert SPACE or TAB type, not apex (') or ampersand (&).

It is possible to insert note lines, they must be preceded by apex ('):

' This is a note example

After the output programming, it is possible to program the Offsets. Those commands can be written at the bottom after ampersand type (&):

16 0 2200 ' last programmed output

**& ' following lines are commands
' for offsets**

**3 120 -550 ' output n. 3 will go ON 12° after
' rising edge and go OFF 55°
' before falling edge**

The offset value can be negative to indicate an advance. It has to be between -1800 and 1800 (higher values have no sense).

Important:

After the last type of the last line insert a return type.

6.5.1 Work files diagnostic

If some commands are wrong, the internal diagnostic notifies the error changing the type color and writing in bold type. An important check is done on possible "overlapping" in rates or after putting in an offset.

Two special cases are not considered in diagnostic:

xx 0 0 ' used to set xx output always OFF

xx 1 1 ' used to set xx output always ON

To erase an encoder program, send an empty program to the desired program number.

6.5.2 File extension

The file extension is not binding, as default it is ".txt" for a single program and ".lis" for a list of programs.

List files can be created with text editor. The syntax is: program number followed by SPACE or TAB type and complete path of program file in round brackets.

1 (C:\program\rotacam\demo3.txt)

7 (C:\lika\rotacam\demo6.txt)

in this example, demo3.txt will be loaded as in program 1 and demo6.txt in program 7.

6.5.3 Functioning problems

If during the software installation an error message of VB appears, chose "Continue".

Some application, as fax or printer, use COM gates. If a message advises you that the COM gate is already in use or it is not available, chose another COM gate or temporary close the application that causes the problem.

6.6 Rotacam S568

This product is a special version of Lika's ROTACAM ASR58. A special software version allows to program cyclic cams by means of the RS232 interface.

Select **Settings > Model > S568** of the main widow, the programming window will be adapted to the encoder characteristics.

With this model, the file extension will be **".568"**.

On S568 panel are shown 16 lines corresponding to the 16 outputs. In every line you can put in the offset, the ON state length and OFF state length. Button **"0"** sets the output always OFF and **"1"** sets the output always ON.

The **"Send out xx"** button sends the output programming to the encoder.

The **"Append"** button writes all data of the S568 box on the left related to the program number selected on the bottom in the program window.

The **"Synchronize"** button runs the commands written on program panel, all 16 encoder programs are involved.

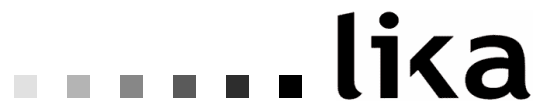
The **"RST"** button erases all outputs and all encoder programs. The **"DFT"** button loads a default encoder program.

With the S568 model, contrary to the other model, when a program is sent to the encoder only the involved outputs are changed, the ones not involved are not changed. If necessary use RST command.

Man.Vers.	Description
1.0	1st issue
1.1	Application SW and manual update
1.2	Application SW and manual update
1.3	Application SW and manual update
1.4	Chapter 4.1 correction
1.5	Chapter 6.5 correction



This device is to be supplied by a Class 2 Circuit or Low-Voltage Limited Energy or Energy Source not exceeding 30 Vdc. Refer to the product datasheet for supply voltage rate.



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