

**TILQUIST**

# NIVOROTA

ROTARY PADDLE LEVEL SWITCHES



30 YEARS

LEVEL



OUR PROFESSION IS YOUR LEVEL

LEVEL SWITCHES

## MAIN FEATURES

- Level switching of free flowing solids
- Cable or rod extended versions up to 3 m
- Automatic motor shutdown
- High temperature version
- IP 67 protection
- Dust-Ex certified version

## APPLICATIONS

- **Food industry:** sunflower, sunflower cod, coffee and, cacao powder, flour, sugar, etc.
- **Chemical industry:** plastic powders, granules, pellets
- **Building industry:** cement, sand, calcium powder, gypsum
- **Energy industry:** active soot, coal powder, fly ash

## GENERAL DESCRIPTION

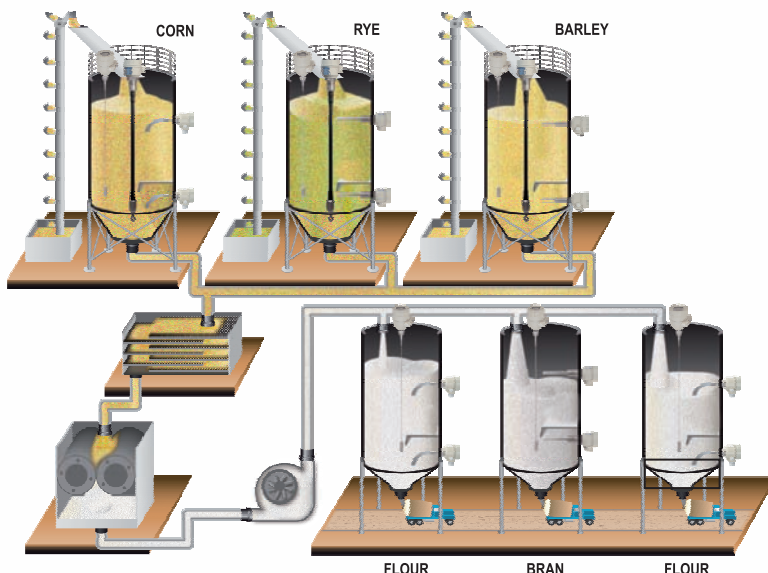
The new **NIVOROTA** rotary paddle level switch series of well-known NIVELCO design can be used for detecting the level of lumpy or powdery materials and granules. Mounted to tanks, silos and hoppers it can monitor and control level, filling and emptying of stored materials such as stone, fly ash, sand, coal, feed, beet slice, etc. A small power electric motor drives the paddle which rotates freely in the absence of the material. When the paddle is immersed by the material reaching it, the motor will be switched off the same time triggering the output contact switch. When the material level drops the paddle runs free again, the motor is reactivated and the switch returns to its original state. The new series **NIVOROTA E-700 & E-800** rotary paddle level switches provide all the advantageous features of the previous series in one unit. Dust Ex versions are available for use in hazardous environments.



## TYPE SELECTION

For appropriate model selection the following should be taken into consideration:

- **Insertion length:**
  - Level switching application (low or high level switch) and the position of installation determine the insertion length.
- **Number of vanes:**
  - Specific gravity and particle size of the material provides orientation for the number of vanes.
  - Most commonly used is the stainless steel, single vane paddle. This paddle can be passed through the respective threaded connection.
  - For lighter materials the use of 3-vane paddle is recommended.
- **Flexible coupling:**
  - Use if the shaft of the instrument has to be protected against falling materials. (rocks, larger lumpy materials)



Other considerations depending on the application:

NIVOROTA	E-700	E-800
Metal housing	■	–
Plastic housing	–	■
Single vane paddle	■	■
Multi-vane paddle	■	■
Flexible coupling	■	■
Cable extension	■	■
DC power supply	■	■
Dust Ex version	■	–
High temperature version	■	–
1" process connection	■	■
1 1/2" process connection	■	■
Torque adjustment	■	■

Material	Density (kg/dm <sup>3</sup> )*
Wheat	0.4 – 0.5
Flour	0.6 – 0.8
Wood chip	0.3 – 0.4
Sawdust	0.3 – 0.35
Whiting	0.8 – 1
Lime hydrate dust	0.4 – 0.5
PVC dust	0.3 – 0.6
PVC granule	0.3 – 0.6
Sunflower corn	0.3 – 0.5
Sunflower cod	0.1 – 0.2
Feed	0.2 – 0.6
Ground paprika	0.8 – 1

\* Informative data

## TECHNICAL DATA

TYPE	NIVOROTA EK□-700/800 Normal type	NIVOROTA EH□-700 High temperature type
Insertion length	Standard: 200 mm, max. 3 m	
Paddle material, number of vanes	Stainless steel DIN 1.4571 / 1, 3; as per order code	
Rotation speed	≈ 1 rotation / min.	
Material of wetted parts	Stainless steel DIN 1.4571	
Medium density (guideline value)	min. 0.1 kg / dm <sup>3</sup>	
Material of the sealing	NPR	FPM
Medium temperature	EK-700: -20 °C ... +120 °C EK-800: -20 °C ... +80 °C	-20 °C ... +200 °C
	Ex type: See special data for Ex certified models table	
Ambient temperature	-30 °C ... +60 °C	
Medium pressure	max. 0.3 MPa (3 bar)	
Output	microswitch: SPDT 250 VAC, 10 A, AC1	
Paddle-rotation / shutdown indication	Bi-colour (green/red) LED	
Process connection	1", 1½", as per order code	
Power supply	24 V AC, 24 V DC, 120 V AC, 230 V AC (+10% -15%)	
Power consumption	max. 4 VA (4W)	
Electrical connection	Cable gland: 2 pcs. plastic M20x1.5; for Ø6..12 mm cable, screw terminal for: 0.5..2.5 mm <sup>2</sup> wire cross section	
Electrical protection	Class I.	
Ingress protection	IP67	
Housing material	Paint coated aluminium or plastic (PBT)	Paint coated aluminium
Mass	1.7 kg, cable extension: 1.4 kg/m, counterweight: 1 kg, rod extension: 1.6 kg/m	

## SPECIAL DATA FOR EX CERTIFIED MODELS

Protection type	tD						
Ex marking	ATEX  II 1/2 D Ex tb IIIC T <sub>1</sub> °C IP67						
Electrical connection	2 pcs. steel M20x1.5 cable glands for Ø 8 ... 13 mm cable						
Temperature data	Normal type			High temperature type			
Temperature class	T85 °C	T100 °C	T135 °C	T85 °C	T100 °C	T135 °C	T200 °C
Medium temperature	85 °C	100 °C	120 °C	85 °C	100 °C	120 °C	200 °C
Ambient temperature	65 °C	65 °C	50 °C	65 °C	65 °C	65 °C	65 °C
Max. surface temperature	85 °C	100 °C	120 °C	85 °C	100 °C	120 °C	200 °C
Waiting time for opening the cover	30 min.	20 min.	5 min.	30 min.	20 min.	5 min.	0 min.

## OPERATION MODES

Power supply	Status LED	Output microswitch	Paddle
ON	 Green	 De-Energised	Rotate
	 Red	 Energised	Not rotate
OFF	 Dark	 De-Energised	Not rotate



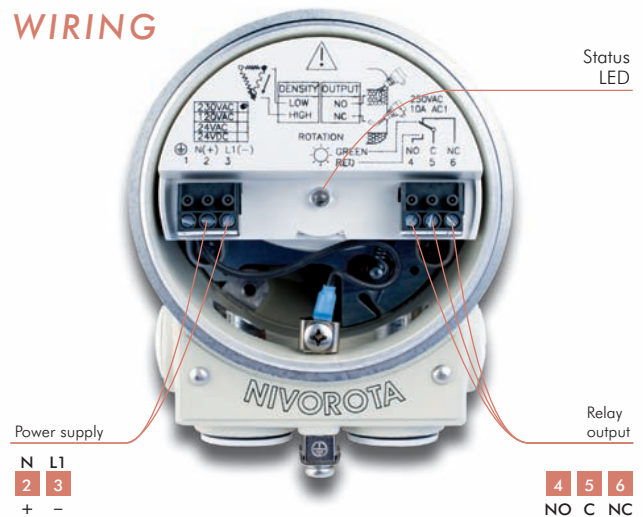
## DIMENSIONS

1-vane paddle	3-vane paddle	Flexible coupling
EKA-702-1M30000	EKF-702-1M30000	EAS-701

Mounting plate	Sliding sleeve for rod extended version
EAM-70□	EAM-703

Adapter		
EAA-601	EAA-602	EAA-603

## WIRING



## DIMENSIONS

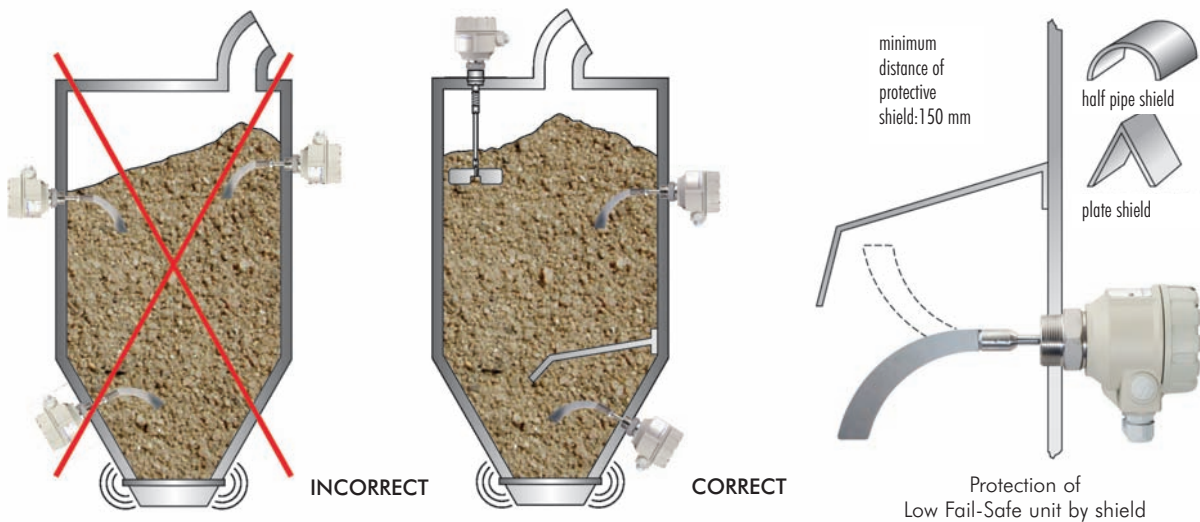
Standard version		
1-vane paddle	1-vane paddle with flexible coupling	3-vane paddle
EK□-□02-□	EK□-□03-□	EKF-□02-□

Cable extended version with counterweight	
1-vane paddle	3-vane paddle
EKK-□□□-□	EKL-□□□-□

Rod extended version	High temperature type, standard version	
1-vane paddle	1-vane paddle	
EKR-□□□-□	EHQ-702-□	

## MOUNTING

The unit should be protected from strong material inflow by appropriate selection of the installation place or by using an overhead protective shield. When the instrument is mounted on the side of the tank, coning or arching of the material should be considered. The device should be screwed into a 1" or 1 1/2" screw, the single vane paddle will pass through the 1" , or 1 1/2" hole. If the hole is even wider or other considerations warrant it the suitable mounting plates can be used. Adjust the position of the torque spring according to the density of the material (for higher density higher torque setting should be used). If insertion length should be customized for any technological reason, optional sliding sleeve can be used for rod extended versions, or cutting the cable to the needed length can be performed in case of cable extended versions. The counterweight provides taut state for the cable and prevent that the paddle may 'shin up' to the medium surface.



## ORDER CODES (NOT ALL COMBINATIONS AVAILABLE)

### NIVOROTA rotary paddle level switches

NIVOROTA E ■ ■ ■ - ■ ■ ■ - ■ (1)

Type	Code	Housing	Code	Insertion length	Code	Output / Ex	Code
Normal	K	Aluminium	7	Standard	0.2 m	230V AC	1
High temperature	H	Plastic (2)(3)	8		0.3 m	120V AC	2
				Rod extended version	⋮	24V AC	3
					⋮	24V DC	4
					3 m	230V AC / Ex	5
				Cable extended version	1 m	120V AC / Ex	6
					2 m	24V AC / Ex	7
					3 m	24V DC / Ex	8

Version / Paddle / Process connection(4)	Code
Standard / 1-vane paddle / 1" BSPT	A
Standard / 1-vane paddle / 1 1/2" BSPT	H
Cable extended / 1-vane paddle / 1 1/2" BSPT	K
Rod extended / 1-vane paddle / 1 1/2" BSPT	R
Standard / 3-vane paddle / 1 1/2" BSPT	F
Cable extended / 3-vane paddle / 1 1/2" BSPT	L

- (1) The order code of an ex version should end in „Ex“
- (2) Not available in high temperature type
- (3) Ex version is not available
- (4) Different combinations are available on special orders

## ACCESSORIES

EAM-70 ■

Mounting accessories	Code
1" female nut / (1.4571)	1
1 1/2" female nut / (1.4571)	2
Sliding sleeve for rod extended version (1.4571)	3
Mounting plate, 1" hole (1.4571)	4
Mounting plate, 1" hole (carbon steel)	5
Mounting plate, 1 1/2" hole (1.4571)	6
Mounting plate, 1 1/2" hole (carbon steel)	7

Paddles (1.4571 stainless steel)	
Name	Code
1-vane paddle	EKA-702-1M30000
3-vane paddle	EKF-702-1M30000

Adapters (1.4571 stainless steel)	
Name	Code
1" BSP → 1 1/2" BSP	EAA-601
1" BSP → 1 1/2" NPT	EAA-602
1 1/2" BSP → 2" BSP	EAA-603
1 1/2" BSP → 1 1/4" NPT	EKH-402-1M00001

Other accessories	
Name	Code
Counterweight	EAW-701
Flexible coupling	EAS-701
Split pin (3x20)	4cesp3x20yko
Mounting plate sealing	EAM-704-1M-003