

for free flowing solids

NIVOROTA

ROTARY PADDLE LEVEL SWITCHES



LEVEL SWITCHES

OUR PROFESSION IS YOUR LEVEL

LEVEL

MAIN FEATURES

- Level switching of free flowing solids
- Cable extended versions up to 3m
- Automatic motor shut-down
- High temperature version
- Dust-Ex versions

MAIN APPLICATION AREAS

- **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 **NIVOROTA** rotary paddle level switch series of robust 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 impeded by the material reaching it, the motor will be switched off the same time triggering a dry contact control switch.

When the material level drops the paddle runs free again, the motor is reactivated and the control switch returns to its original position. Units of the E-500 true fail-safe series can through its self-diagnostic capability distinguish between "sensing" (level too high or low) and "fault" of device and separate outputs are provided for material sense and unit status (fault). This is performed by electronic monitoring components of the unit such as motor, shaft, microswitch, spring, etc. Dust Ex versions are available for use in hazardous environments.

TYPE SELECTION

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

- **Protrusion length**
 - Level switching application (low or high level switch) and the position of installation determine the protrusion 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 blade. This paddle can be passed through the respective threaded connection.
 - For lighter materials the use of 3- or 4-vane paddle is recommended
- **Plastic paddle:**
 - If there is an extra risk of breakage of the metal paddle it is practical to use a plastic paddle.
- **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:**

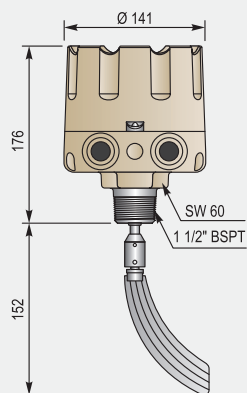
Material	Density (kg/dm ³)*
Wheat	0.4 – 0.5
Flour	0.6 – 0.8
Wood chip	0.3 – 0.4
Sawdust	0.3 – 0.35
Whiting	0.8 – 1
Lime hydrate dust	0.4 – 0.5
PVC dust	0.3 – 0.6
PVC granule	0.3 – 0.6
Sunflower corn	0.3 – 0.5
Sunflower cod	0.1 – 0.2
Feed	0.2 – 0.6
Ground paprika	0.8 – 1

	E-400	E-500	E-600
Single vane paddle	■	■	■
Three / four vane paddle	■	■	–
Flex. coupling	■	■	■
Cable extension	■	■	■
True fail-safe	–	■	–
DC power supply	■	■	–
Ex version	■	■	■
High temp. version	■	■	–
1" mounting	–	–	■
1 1/2" mounting	■	■	–
Mounting plate	■	■	■
Torque setting	■	■	■

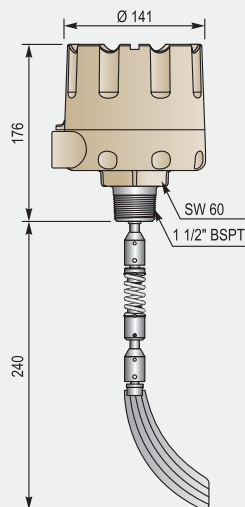
* Informative data

VERSIONS

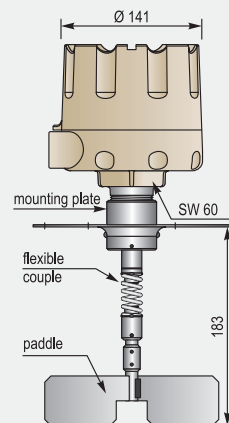
E-400 / 500 series



Standard version
EKH - □02

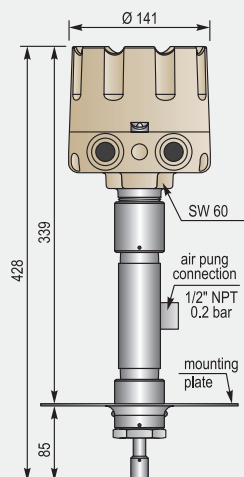


Standard version with flexible coupling
EKH - □03

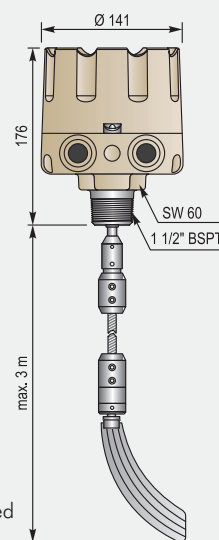


Three vane paddle version
with flex. coupling
and mounting plate
EKF - □03

E-400 / 500 series High temp. version

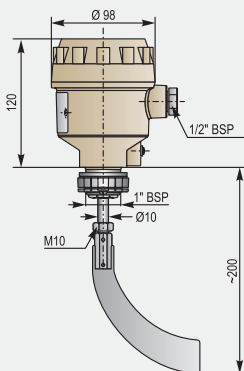


High temp. version
(only with mounting plate)
EHO - □□□

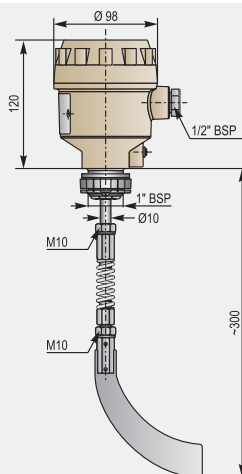


Cable extended
version
EKK - □□□

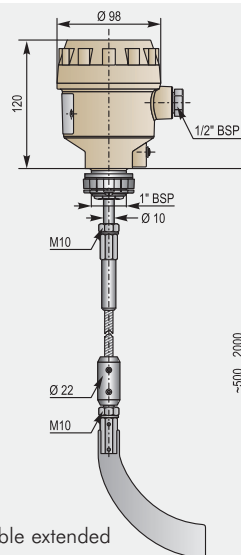
E-600 series



Standard version
EKH-602



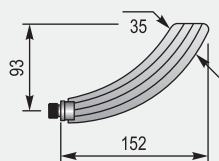
Standard version
with flex. coupling
EKH-603



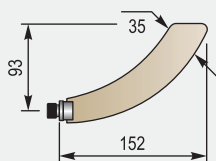
Cable extended
version
EKH - 6□□

ACCESSORIES

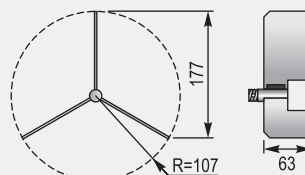
E-400 / E500 series



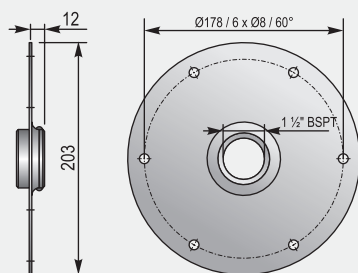
Single vane paddle / 1.4571
4xek400041xko



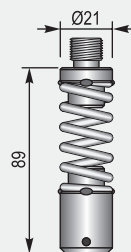
Single vane paddle / plastic
EKM4021M20000



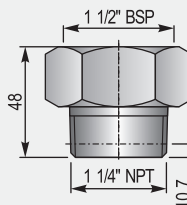
Three vane paddle / 1.4571
4xek400043xko



Mounting plate / painted aluminium
4xek310064xac

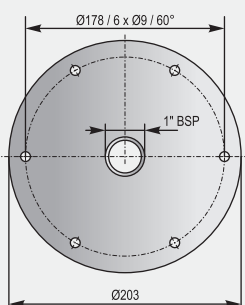


Flexible coupling / 1.4571
4xek50005flex

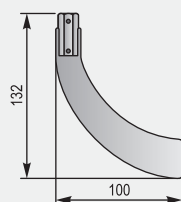


1 1/2" to 1 1/4" adapter /
1.4571
EKH4021M00001

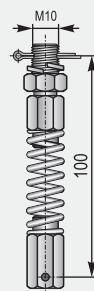
E-600 series



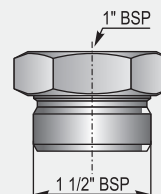
Mounting plate /
painted carbon steel
EAM-601



Single vane paddle /
1.4571
EAP-611



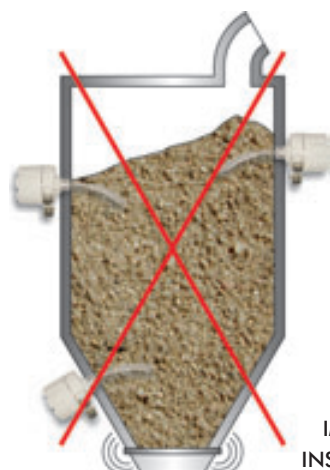
Flexible coupling / 1.4571
EAS-601



1" to 1 1/2" adapter /
1.4571
EAP-601

INSTALLATION

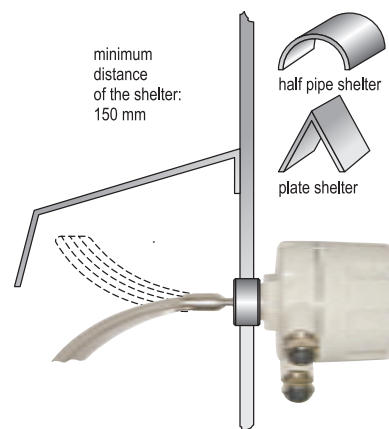
The unit should be protected from material flow by appropriate selection of the installation place or by shelter. The device should be screwed in into a 1" BSP or 1 1/2" NPT female process connection. The single vane paddle will pass through the 1" BSP hole. If the thread is 1 1/2" BSP an EAA-601 type adapter should be used. If the hole is even wider or other considerations warrant it the EAM-601 type mounting plate 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). The vane of the cable extended version can sometimes shin up with the moving material resulting in unreliable level switching. This can be avoided by fitting a pipe on the cable.



IMPROPER
INSTALLATION



PROPER
INSTALLATION



Protection of
a Low Fail-Safe unit by shelter

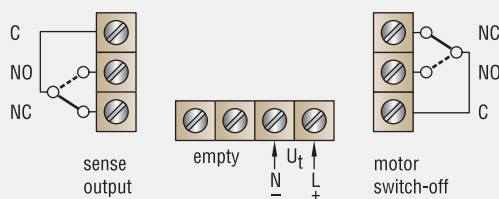
TECHNICAL DATA

		EK□-4□□	EH□-4□□	EK□-5□□	EH□-5□□	EK□-6□□
Insertion length		max. 3 m				max. 2 m
Paddle mat. / No. of vanes		DIN 1.4571: 1.3				
Rotation speed		1 rpm				
Material of wetted parts	Housing	Painted aluminium cast				
	Mounting plate	Painted carbon steel				Painted aluminium cast
	1, 3 vane paddle	1.4571				
	1 vane paddle	–				Glass fibre epoxy
	Flex coupling	1.4571				
	Cable	1.4571				
Medium density		min. 0.08 kg/dm³				min. 0.5 kg/dm³
Medium temperature	Normal	–40°C..+150°C	–40°C..+400°C (air purged)	–40°C..+150°C	–40°C..+400°C (air purged)	–30°C..+70°C
	Ex	–40°C..+93°C	–	–40°C..+85°C	–	–10°C..+70°C
Ambient temperature		–40°C...+65°C				
Medium pressure		max. 2 bar [0.2 MPa]				
Output		SPDT 250 VAC, 15 A, AC1		SPDT* 277 VAC, 5 A, AC1		SPDT 250 VAC, 5 A, AC1
Fault output		–	–	SPDT* 277 VAC, 5 A, AC1		–
Process connection		1 ½" BSPT*, mounting plate				1" BSP, mounting plate
Power supply		230 VAC, ±15%, 9 VA; 24 V AC ±15%, 11 VA; 110 VAC, ±15%, 9 VA; 24 V DC ±15%, 11 W				230 V, 110 V, 24 V AC max 3 W
Electrical connection		2pcs M20x1.5 cable gland, screw terminal for 2.5mm² cross-section, cable Ø10...14mm				½" BSP; cable gland for Ø8..12 mm cable, screw terminal for 0.5..2.5 mm² wire cross-section
Electrical protection		Class I.				
Ingress protection		IP 66				IP 65
Dust Ex approval		ATEX  II 1/2 D T100°C	–	ATEX  II 1/2 D T85°C	–	ATEX  II 1/2 D IP65 T85°C
Mass		4 kg, cable: 0.6 kg/m				1.7 kg, cable: 0.6 kg/m

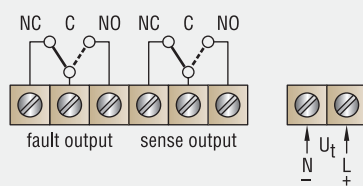
* BSPT: can be screwed into BSP thread

WIRING

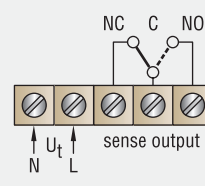
E-400 series



E-500 series



E-600 series



U_t = power supply

ORDER CODES (NOT ALL COMBINATIONS AVAILABLE)

NIVOROTA E-400 / E-500 series

NIVOROTA E - - - - *									
Function	Code	Version / Paddle / Connect.	Code	Code	Insertion	Code	PSupp./Ex	Code	
Switch	K	Standard / 1 x 1.4571 / 1½" BSPT	H	0	0 m	0 m	0	230 V AC	1
High temp switch	H**	Standard / 3 x 1.4571 / mounting plate	F	1	1 m	0.1 m	1	115 V AC	2
		Standard / 1 x plastic / 1½" BSPT	M	2	2 m	0.2 m	2	24 V AC***	3
		Cable / 1 x 1.4571 / 1½" BSPT	K	3	3 m	0.3 m	3	24 V DC	4
		Cable / 3 x 1.4571 / mounting plate	L			0.4 m	4	230 V AC/Ex	5
						0.5 m	5	115 V AC/Ex	6
						0.6 m	6	24 V AC/Ex***	7
						0.7 m	7	24 V DC/Ex	8
						0.8 m	8		
						0.9 m	9		

Version	Code
Standard	4
Fault ind.	5

* The order code of an Ex version should end in 'Ex'
 ** With mounting plate only
 *** The E-400 -500 -3; -7 versions have 24 V AC/DC power supply

NIVOROTA E-600 series

NIVOROTA E - 6 - - - *									
Function	Code	Version / Paddle / Connect.	Code	Code	Insertion	Code	PSupp./Ex	Code	
Switch	K	Standard / 1 x 1.4571 / 1" BSP	H	0	0 m	0 m	0	230 V AC	1
		Cable / 1 x 1.4571 / 1" BSP	K	1	1 m	0.1 m	1	110 V AC	2
				2	2 m	0.2 m	2	24 V AC**	3
						0.3 m	3	230 V AC/Ex	5
						0.4 m	4	110 V AC/Ex	6
						0.5 m	5	24 V AC/Ex**	7
						0.6 m	6		
						0.7 m	7		
						0.8 m	8		
						0.9 m	9		

* The order code of an Ex version should end in 'Ex'
 ** Under development

Accessories

Accessory	E-400 / E-500	E-600
1 vane paddle	4xek400041xko	EAP-611
3 vane paddle	4xek400043xko	—
Mounting plate	4xek310064xac	EAM-601
Flex coupling	4xek50005flex	EAS-601
1½" BSP to 1¼" NPT adapter	EKH4021M00001	—
1" BSP to 1½" BSP adapter	—	EAA-601
1" BSP to 1½" NPT adapter	—	EAA-602

NIVELCO PROCESS CONTROL CO.

H-1043 BUDAPEST, DUGONICS U. 11.

TEL.: (36-1) 889-0100 ♦ FAX: (36-1)889-0200

E-mail: sales@nivelco.com http://www.nivelco.com