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## Rotary Paddle Level Switch



# INTRODUCTION

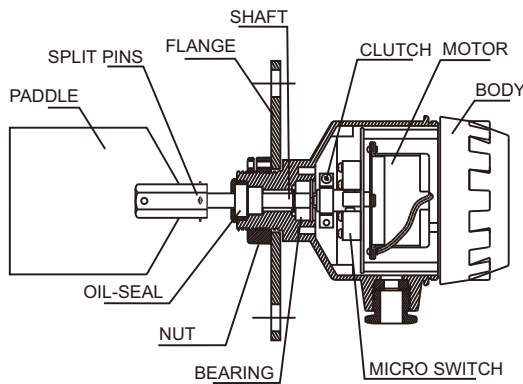
## WORKING PRINCIPLE

The purpose of the rotary paddle level switch is to detect the presence of solid/powdery material in most kinds of tanks, bins and containers. The unit is usually located through a bin wall at the top, middle or low level of a bin. During normal operation (no material present) a synchronous motor rotates the paddle at RPM. When this paddle rotation is impeded by material, surrounding the paddle, motor will stall and cause the Micro-switch to change state (indicating an alarm or control).

## APPLICATIONS

- Plastics and synthetics
- Chemicals and fertilizer
- Pharmaceuticals
- Food and beverage,
- Agriculture and fodder mills/depots
- Cement as well as ceramics
- Power plants
- Various incinerators

## STRUCTURE



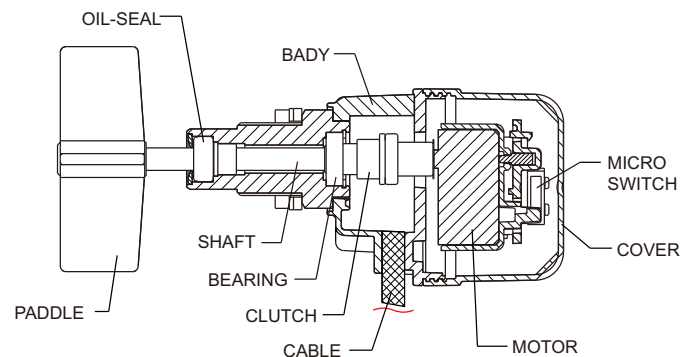
**STANDARD TYPE SE1**

## FEATURES

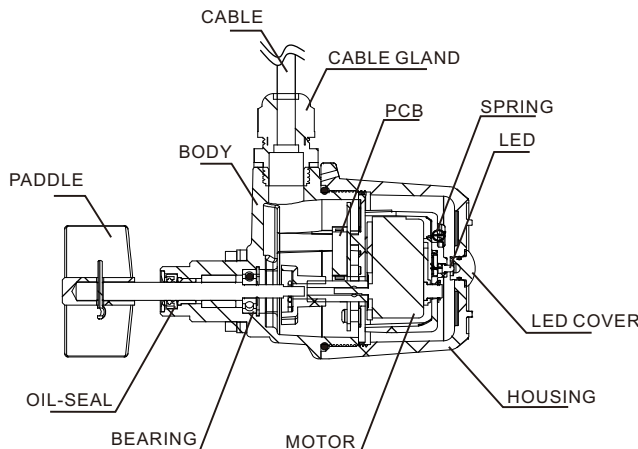
- Rugged sealing ring prevents dust from infiltrating the housing body along the shaft.
- Adjustable torque.  
If the rotary paddle encounters overloading, the motor will automatically shut down the motor to prevent damage to the inner mechanisms and extend motor life.
- Very suitable for small tanks and low density materials
- Adjustable and extendible shaft models available
- A wide variety of paddles are available

## BENEFITS

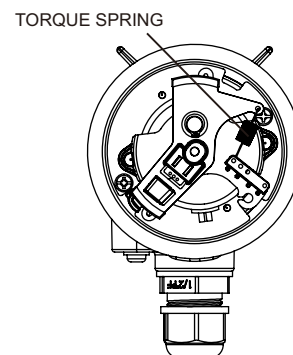
- Airtight sealed device.
- Outdoor and strenuous environment application
- Stable and reliable performance.
- Lightweight and easy to install
- Practically designed to allow maintenance, checks and replacement
- Not necessary to remove the complete set from the tank.



**MINI TYPE SE2**



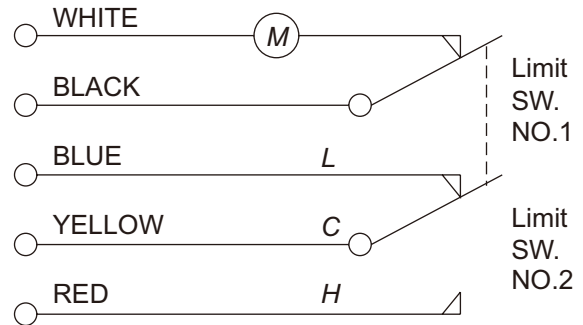
**MINI TYPE SE3**



# WORKING PRINCIPLE & TORQUE ADJUSTING

## CONTROL SWITCH WORKING PRINCIPLE

1. A synchronous turning motor indicates the tank or container's material isn't obstructing the paddles, C & L [COM & NC] are connected.
2. When the material is obstructing the paddles, C&L [COM & NC] are disconnected, C&H [COM & NO] are connected and the motor's current is cut off.
3. When the material drops away from the paddles and the motor starts again C & L [COM & NC] connect and the cycle has begun once again.



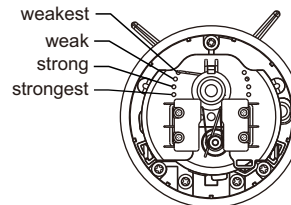
## TORQUE ADJUSTING MECHANISM AND WIRING

The torque spring is applied to adjust the shaft output torque. Default settings are "weak" and can be adjusted to the customer's target based on the tank contents and S.G. (special gravity) of the material.

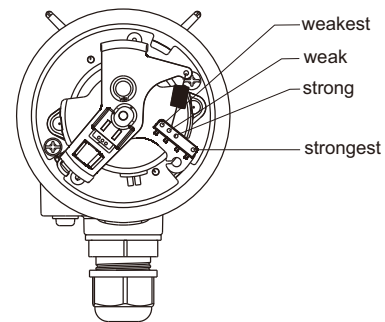
Higher S.G. materials require stronger torque settings. Start with high settings and slowly release the torque force until the appropriate setting is found.

- Do not tamper with the spring as it may cause the Rotary Paddle to malfunction.

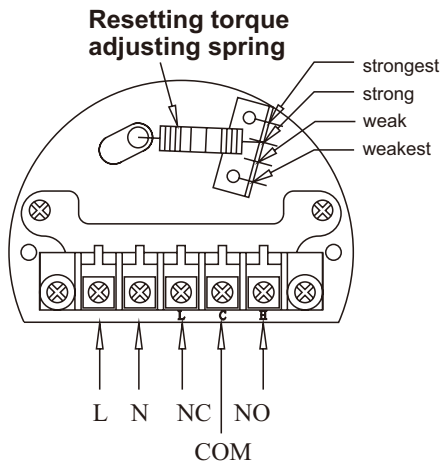
### Spring adjusting hole



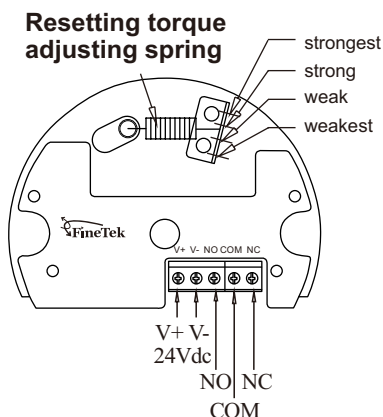
SE29



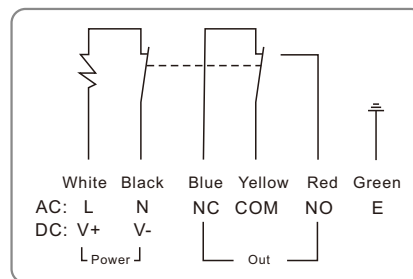
SE38



Available: SE1 (A,B,C,D)



Available: SE1(E)



Available: SE2/SE3

# STANDARD TYPE

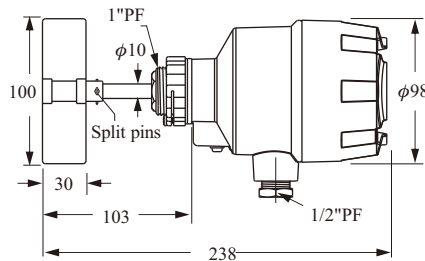
- **Power source** : (A)110Vac,(B)220Vac,(C)240Vac, (D)24Vac, 50/60Hz (E)24Vdc
- **Power consumption** : 3W, 11W(DC24V)
- **Contact capacity** : SPDT, 5A/250Vac
- **Rotary speed** : 1 R.P.M.
- **Insulation test voltage** : 2500V
- **Connection** : 1"PF screw or JIS 2-1/2" x 5kg/cm<sup>2</sup> flange
- **Protection/ material** : IP65 / ADC-12
- **Conduit** : 1/2"PF
- **Material density** : 0.5 g/cm<sup>3</sup>

## SCREW TYPE

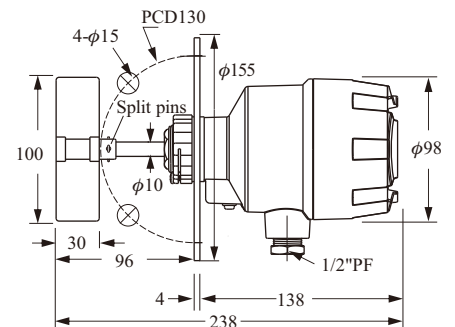
### SE110 Series

- Horizontal mounting
- Operation Temperature (-20°C ~ 70°C)
- Weight: 1.2 kg

### SE110 Series



### SE111 Series



## FLANGE TYPE

### SE111 Series

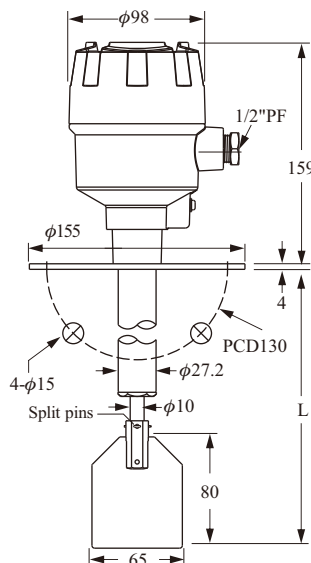
- Horizontal mounting
- Operation Temperature (-20°C ~ 70°C)
- Weight: 1.7 kg

## SHAFT PROTECTIVE TUBE TYPE

### SE120 Series

- Horizontal /Vertical mounting
- Operation Temperature (-20°C ~ 70°C)
- Weight: 1.2 kg
- Standard Length:
  - L--250mm (2.2 kg)
  - L--500mm (2.5 kg)
  - L--750mm (2.8 kg)
- Customized lengths available

### SE120 Series

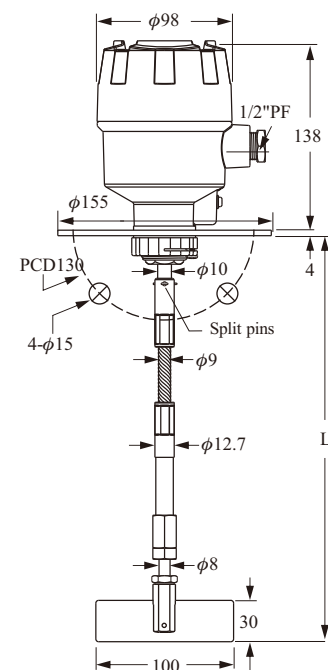


### SE130 Series

## SHAFT LENGTH ADJUSTABLE TYPE

### SE130 Series

- Vertical mounting
- Operation Temperature (-20°C ~ 70°C)
- Standard Length:
  - L- 460~630mm (2.5 kg)
  - L- 650~1000mm (2.8 kg)
  - L- 760~1200mm (3.0 kg)
- Customized lengths available



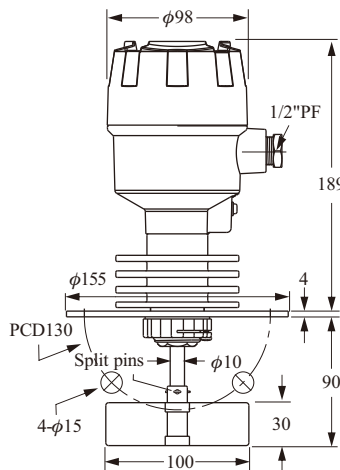
# STANDARD TYPE

## HI-TEMP TYPE

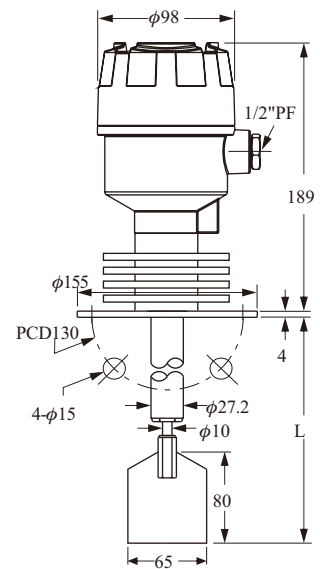
### SE140 Series

- Horizontal mounting
- Temp. (-20°C ~ 200°C)
- Weight: 2.1 kg

### SE140 Series



### SE141 Series



## HI-TEMP TYPE

### PROTECTIVE TUBE TYPE

### SE141 Series

- Horizontal /Vertical mounting
- Operation Temperature (-20°C ~ 200°C)
- Standard Length (option):
  - L--250mm (2.6 kg)
  - L--500mm (2.9 kg)
  - L--750mm (3.2 kg)
- Special length is made by order

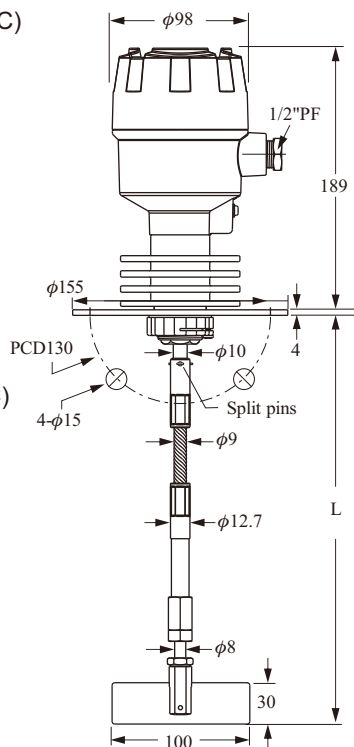
## HI-TEMP SHAFT

### LENGTH ADJUSTABLE TYPE

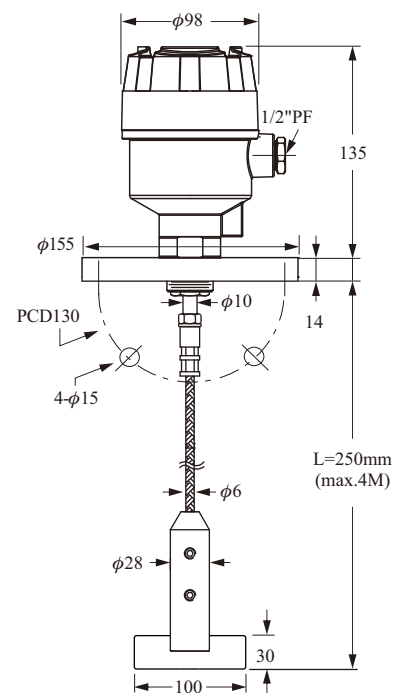
### SE146 Series

- Vertical mounting
- Operation Temperature (-20°C ~ 200°C)
- Standard Length (option):
  - L- 450~630mm (3 kg)
  - L- 650~1000mm (3.3 kg)
  - L- 760~1200mm (3.5 kg)
- Special length is made by order

### SE146 Series



### SE160 Series



## CABLE WIRE TYPE

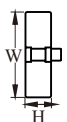
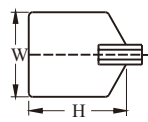
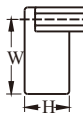
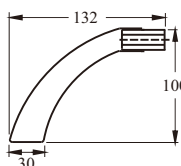
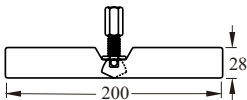
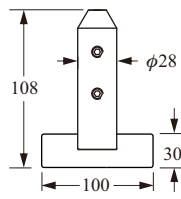
### SE160 Series

- Vertical mounting
- Operation Temperature (-20°C ~ 70°C)
- Standard Length (option):
  - L-- 450mm (2.5 kg)
  - L-- 650mm (2.8 kg)
  - L-- 750mm (3 kg)
- Special length is made by order

# MODEL NUMBER / ORDER CODE COMPARISON TABLE

Model Number	Order Code
SE110	SEX10000-AA
SE111	
SE120	SEX10000-AB
SE130	SEX10000-AC
SE140	SEX10200-AA
SE141	SEX10200-AB
SE146	SEX10200-AC
SE160	SEX10000-AD

New / Old paddle model comparison table

New	Figure	Dimension(WxH)	Old
B		100x30	A
C		65x80	B
D		65x120	C
E		80x80	D
F		50x30	E
G		132x100	F
H		200x28	J
K		100x108	X



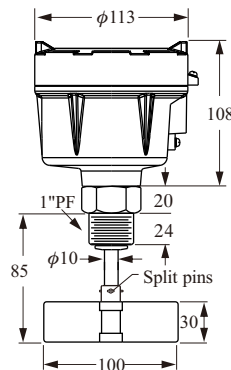
# EXPLOSION PROOF TYPE

- **Power source** : (A)110Vac, (B)220Vac, (C)240Vac  
(D)24Vac, 50/60Hz
- **Power consumption** : 3W
- **Contact capacity** : SPDT, 3A/250Vac
- **Rotary speed** : 1 R.P.M.
- **Insulation test voltage** : AC 1500V × 1minute

- **Connect** : 1"PF screw or flange 1"~6"  
2-1/2" × 5kg/cm<sup>2</sup> (std.)
- **Housing material** : AL Alloy, ADC-12
- **Conduit** : 1/2" (std.) or 3/4"NPT
- **Material density** : 0.5 g/cm<sup>3</sup>

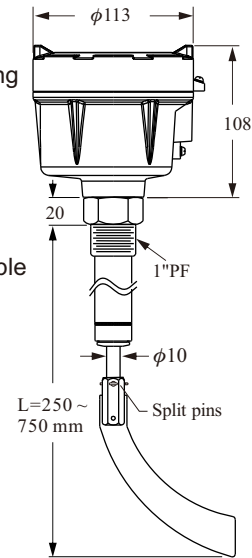
## EXPLOSION PROOF CONNECTION TYPE SE170 series

- Horizontal mounting
- Temp. (-20°C ~ 70°C)



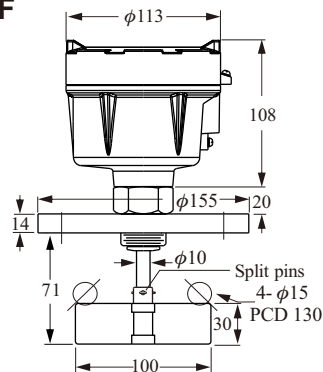
## EXPLOSION PROOF SHAFT PROTECTION TYPE SE172 series

- Horizontal /Vertical mounting
- Temp. (-20°C ~ 70°C)
- Standard Length (option):  
L-- 250mm  
L-- 500mm  
L-- 750mm
- Customized lengths available



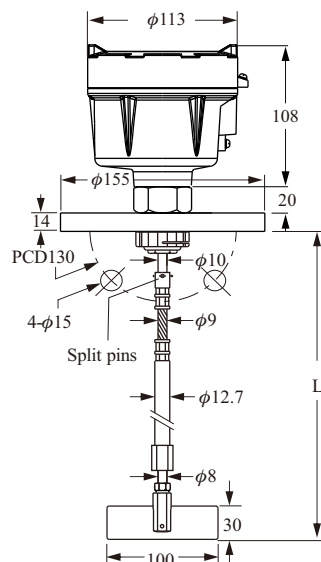
## EXPLOSION PROOF FLANGE TYPE SE171 series

- Horizontal mounting
- Temp. (-20°C ~ 70°C)



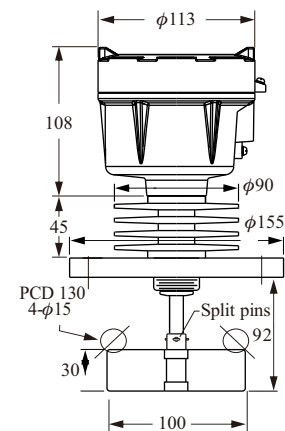
## EXPLOSION PROOF ADJUSTABLE SHAFT TYPE SE173 series

- Vertical mounting
- Temp. (-20°C ~ 70°C)
- Standard Length (option):  
L-- 450 ~630mm  
L-- 650 ~1000mm  
L-- 760 ~1200mm
- Special length is made by order



## EXPLOSION PROOF HI-TEMP TYPE SE174 series

- Horizontal mounting
- Temp. (-20°C ~ 190°C)

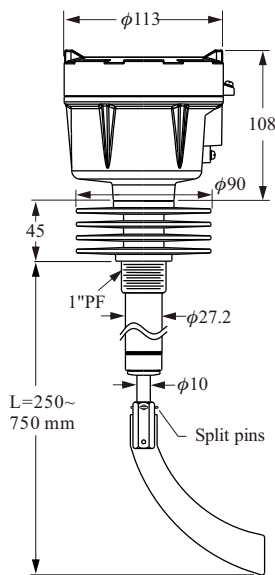




# EXPLOSION PROOF TYPE

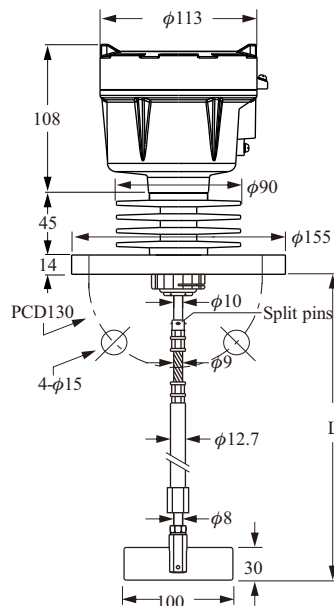
## EXPLOSION PROOF HI-TEMP SHAFT PROTECTIVE TUBE TYPE SE175 Series

- Horizontal /Vertical mounting
- Temp. (-20°C ~ 190°C)
- Special length is made by order



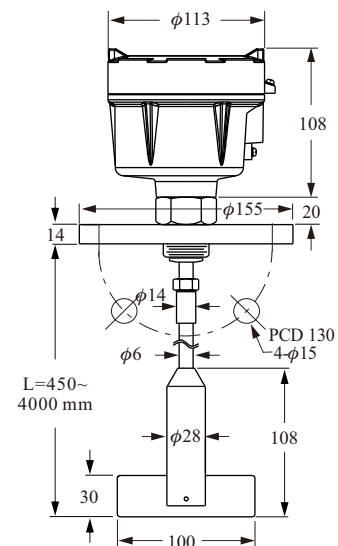
## EXPLOSION PROOF HI-TEMP ADJUSTABLE SHAFT TYPE SE176 Series

- Vertical mounting
- Temp. (-20°C ~ 190°C)
- Special length is made by order

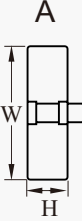
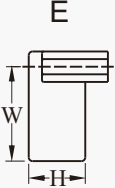
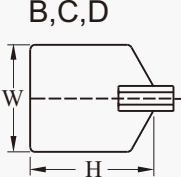
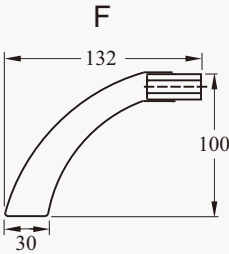


## EXPLOSION PROOF CABLE WIRE TYPE SE177 Series

- Vertical mounting
- Temp. (-20°C ~ 70°C)
- Special length is made by order



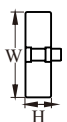
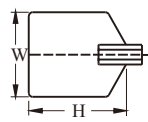
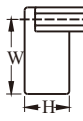
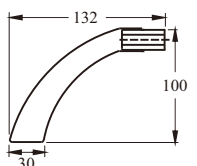
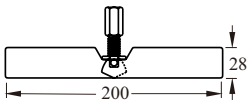
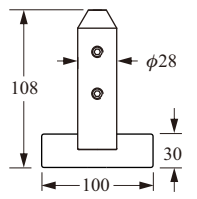
## ■ Paddle Introduction

	<p>(A) 100x30 (WxH), Min. fixed hole diameter size φ90mm.</p>		<p>(E) 50x30 (WxH), Suitable for high S.G. raw materials. Use a small size paddle to decrease the impact of material falling directly on paddle.</p>
	<p>(B) 65x80 (WxH), Directly mounted into 2-1/2" fixed hole.          (C) 65x120 (WxH), Directly mounted into 2-1/2" fixed hole.          (D) 80x80 (WxH)</p>		<p>(F) Scimitar model paddle, Screw tightly on the 1" diameter fixed hole, It is easier to mount and dismount.</p>

# MODEL NUMBER / ORDER CODE COMPARISON TABLE

Model Number	Order Code
SE170	SEX300□□-AA
SE171	
SE172	SEX300□□-AB
SE173	SEX300□□-AC
SE174	SEX302□□-AA
SE175	SEX302□□-AB
SE176	SEX302□□-AC
SE177	SEX300□□-AD

New / Old paddle model comparison table

New	Figure	Dimension(WxH)	Old
B		100x30	A
C		65x80	B
D		65x120	C
E		80x80	D
F		50x30	E
G		132x100	F
H		200x28	J
K		100x108	X

# ORDER INFORMATION

SEX3 ⑤⑥ ⑦⑧ -A ⑩ ⑪ ⑫ ⑬ ⑭ ⑮ ⑯ ⑰ ⑱ ⑲ ⑳ ㉑ ㉒

⑤⑥ **Model**

- 00: Standard
- 02: Hi-temperature

⑦⑧ **Certification**

- 1C: ATEX-Exd
- 2C: IECEx-Exd
- 5C: TS-Exd
- 7C: NEPSI-Exd

⑩ **Construction**

- A: General type
- B: Shaft protective tube type
- C: Shaft length adjustable type
- D: Cable wire type

⑪ **Power supply**

- A: AC110V
- B: AC220V
- C: AC240V
- D: AC24V

**Connection**

⑫⑬

- Flange item
- AK: JIS-FF
- AN: ANSI-RF
- AS: DIN-FF

⑭⑮

- A8: 1"
- B1: 1-1/2"
- B2: 2"
- B4: 2-1/2"

⑯⑰

- 01: PT male
- 03: PF male
- 07: NPT male
- 40: 5 kg/cm<sup>2</sup>
- 42: 10 kg/cm<sup>2</sup>
- 48: 150 Lbs
- 49: 300 Lbs
- 57: PN10
- 58: PN16

⑱ **Paddle model**

- A: None
- B: 100x30(WxH)
- C: 65x80(WxH)
- F: 50x30(WxH)
- G: Scimitar type 132x100(WxH)
- K: 100x108(WxH)(Cable wire type only)

⑲⑳㉑㉒ **Length**

Code	Length range
0001~4000	0001~4000mm

# MINI TYPE(ALUMINUM ALLOY COVER)

Housing cover code:  
 0: Aluminum cover  
 1: Aluminum cover with LED lamp

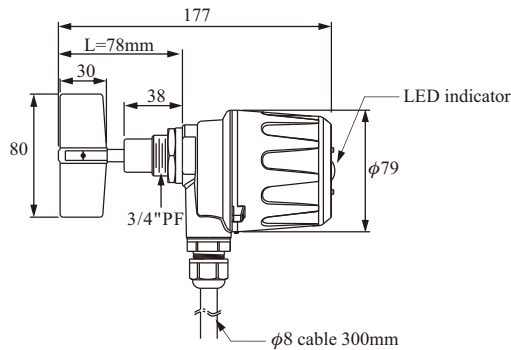
- **Power source** : (A)110Vac,(B)220Vac,(C)240Vac, (D)24Vac, 50/60Hz,(E)24Vdc
- **Power consumption** : 1.5W
- **Contact capacity** : 5A/250Vac, 5A/30Vdc
- **Rotary speed** : 1R.P.M.
- **IP rating** : IP65

- **Housing material** : Aluminum alloy
- **Ambient temperature** : -40°C ~ 85°C
- **Cable length** : 300mm (available for custom length)
- **Material density** : 0.3 g/cm<sup>3</sup>
- **Display status** : Green(Working), Red(Stopped)

## STANDARD TYPE

SE38□0 Series

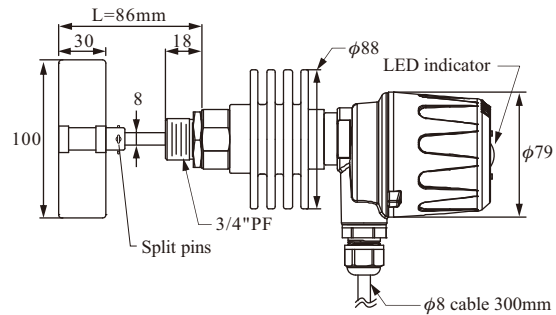
- Operation temperature: -40°C ~ 85°C
- Paddle material: PC



## HIGH TEMPERATURE TYPE

SE38□4 Series

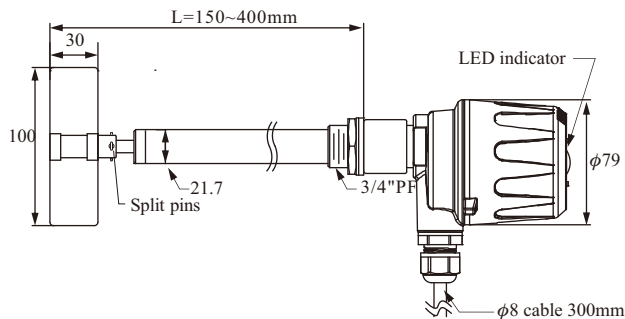
- Operation temperature: -40°C ~ 200°C
- Paddle material: SUS304



## SHAFT PROTECTIVE TUBE TYPE

SE38□2 Series

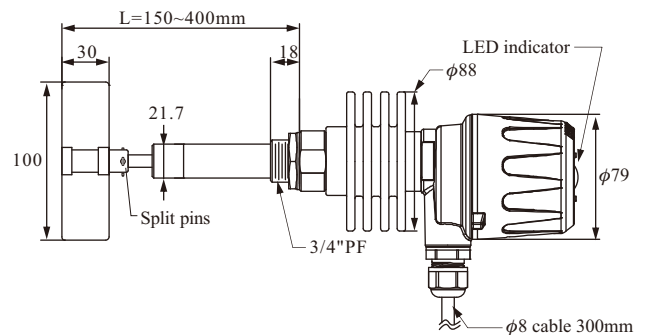
- Operation temperature: -40°C ~ 85°C
- Paddle material: SUS304



## HIGH TEMPERATURE SHAFT PROTECTIVE TUBE TYPE

SE38□5 Series

- Operation temperature: -40°C ~ 200°C
- Paddle material: SUS304



# MINI TYPE(EXPLOSION PROOF)

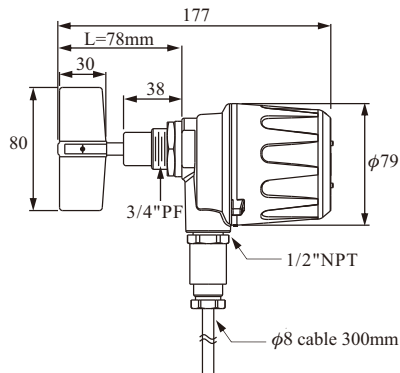
- **Power source** : (A)110Vac,(B)220Vac,(C)240Vac,  
(D)24Vac, 50/60Hz,(E)24Vdc
- **Power consumption** : 1.5W
- **Contact capacity** : 5A/250Vac, 5A/30Vdc
- **Rotary speed** : 1R.P.M.
- **IP rating** : IP65

- **Housing material** : Aluminum alloy
- **Ambient temperature** : -40°C ~ 85°C
- **Cable length** : 300mm (available for custom length)
- **Material density** : 0.3 g/cm<sup>3</sup>

## STANDARD TYPE

### SE3700 Series

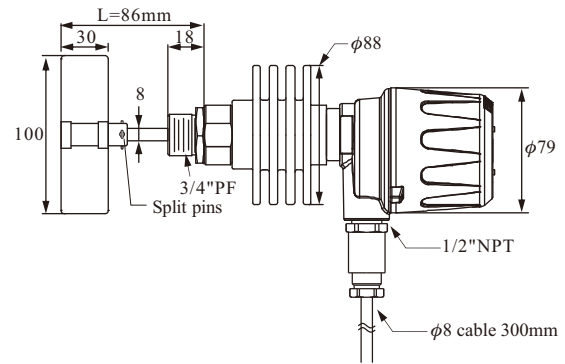
- Operation temperature: -40°C ~ 80°C
- Paddle material: PC



## HIGH TEMPERATURE TYPE

### SE3704 Series

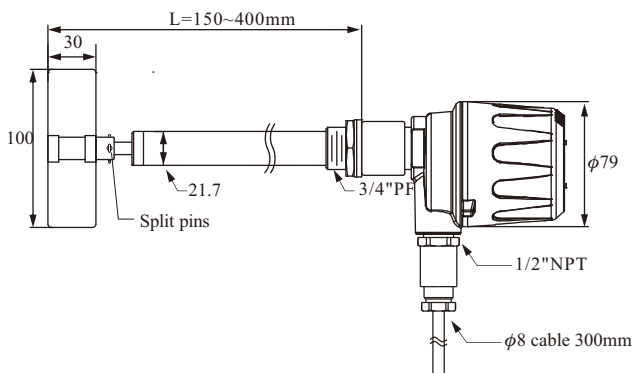
- Operation temperature: -40°C ~ 195°C
- Paddle material: SUS304



## SHAFT PROTECTIVE TUBE TYPE

### SE3702 Series

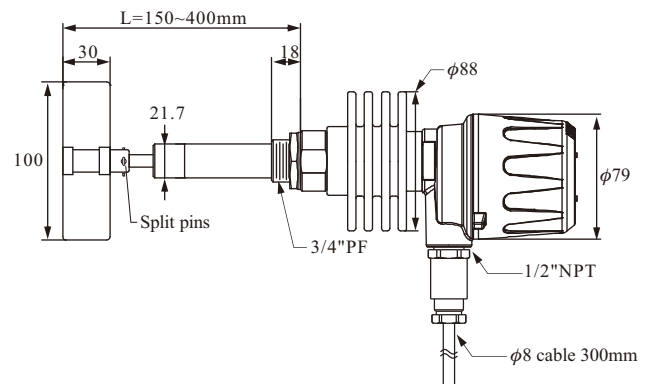
- Operation temperature: -40°C ~ 80°C
- Paddle material: SUS304



## HIGH TEMPERATURE SHAFT PROTECTIVE TUBE TYPE

### SE3705 Series

- Operation temperature: -40°C ~ 195°C
- Paddle material: SUS304



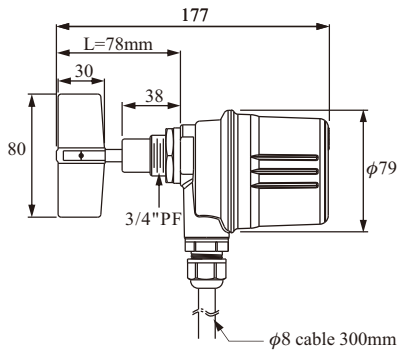
# MINI TYPE(PLASTIC COVER)

- **Power source** : (A)110Vac,(B)220Vac,(C)240Vac,  
(D)24Vac, 50/60Hz,(E)24Vdc
- **Power consumption** : 1.5W
- **Contact capacity** : 5A/250Vac, 5A/30Vdc
- **Rotary speed** : 1R.P.M.
- **IP rating** : IP65

- **Housing material** : Plastic cover
- **Ambient temperature** : -40°C ~ 85°C
- **Cable length** : 300mm (available for custom length)
- **Material density** : 0.3 g/cm<sup>3</sup>

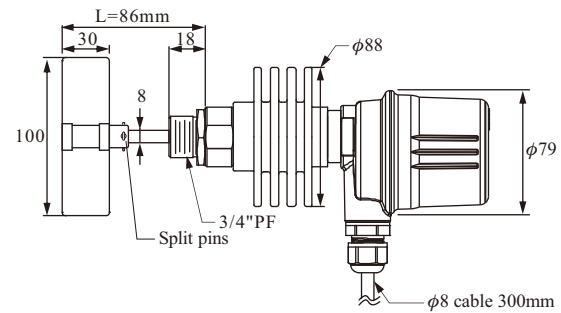
## STANDARD TYPE SE3820 Series

- Operation temperature: -40°C ~ 85°C
- Paddle material: PC



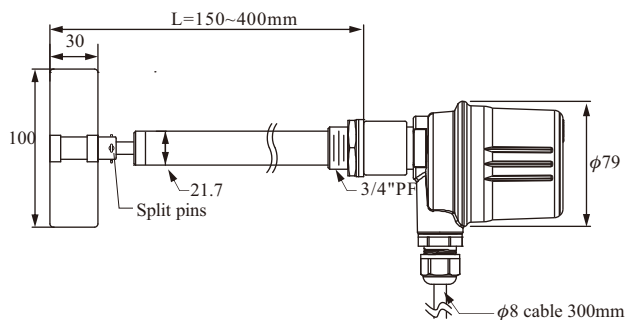
## HIGH TEMPERATURE TYPE SE3824 Series

- Operation temperature: -40°C ~ 200°C
- Paddle material: SUS304



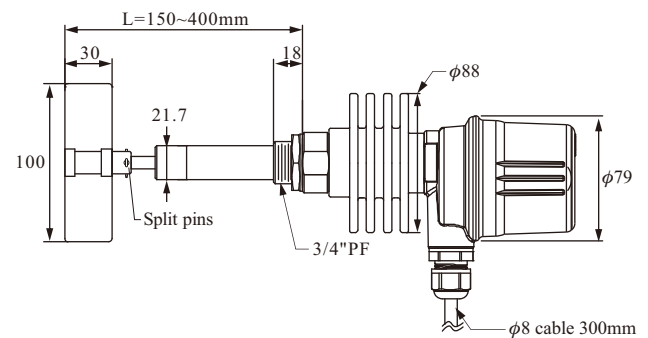
## SHAFT PROTECTIVE TUBE TYPE SE3822 Series

- Operation temperature: -40°C ~ 85°C
- Paddle material: SUS304



## HIGH TEMPERATURE SHAFT PROTECTIVE TUBE TYPE SE3825 Series

- Operation temperature: -40°C ~ 200°C
- Paddle material: SUS304


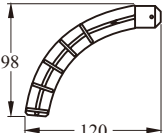
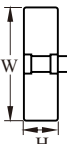
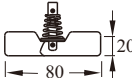


# MODEL NUMBER / ORDER CODE COMPARISON TABLE

Model Number	Order Code
SE3700	SEX2007D-AA
SE3702	SEX2007D-AB
SE3704	SEX2027D-AA
SE3705	SEX2027D-AB
SE3800	SEX20000-AA
SE3810	SEX20000-BA
SE3820	SEX20000-CA
SE3802	SEX20000-AB

Model Number	Order Code
SE3812	SEX20000-BB
SE3822	SEX20000-CB
SE3804	SEX20200-AA
SE3814	SEX20200-BA
SE3824	SEX20200-CA
SE3805	SEX20200-AB
SE3815	SEX20200-BB
SE3825	SEX20200-CB

New / Old paddle model comparison table

New	Figure	Dimension(WxH)	Old
G		80x30	G
H		98x120	H
I		100x30	I
K		80x20	K

# ORDER INFORMATION

SEX2 <sup>05</sup> <sup>06</sup> <sup>07</sup> <sup>08</sup> - <sup>09</sup> <sup>10</sup> <sup>11</sup> <sup>12</sup> <sup>13</sup> <sup>14</sup> <sup>15</sup> <sup>16</sup> <sup>17</sup> <sup>18</sup> <sup>19</sup> <sup>20</sup> <sup>21</sup> <sup>22</sup> <sup>23</sup> <sup>24</sup> <sup>25</sup> <sup>26</sup>

<sup>05</sup> <sup>06</sup> **Model**  
 00: Standard  
 02: Hi-temperature

<sup>07</sup> <sup>08</sup> **Certification**  
 00: None  
 7D: NEPSI-Exd  
 (The housing select A:Alumium cover only)

<sup>09</sup> **Housing**  
 A: Aluminum cover  
 B: Aluminum cover with LED lamp  
 C: Plastic cover

<sup>10</sup> **Construction**  
 A: General type  
 B: Shafe protective tube type

<sup>11</sup> **Power supply**  
 A: AC110V  
 B: AC220V  
 C: AC240V  
 D: AC24V  
 E: DC24V

**Connection**

<sup>12</sup> <sup>13</sup>  
 Flange item  
 AK: JIS-FF  
 AN: ANSI-RF  
 AS: DIN-FF

<sup>14</sup> <sup>15</sup>  
 A7: 3/4"  
 A8: 1"  
 B1: 1-1/2"  
 B2: 2"

<sup>16</sup> <sup>17</sup>  
 01: PT male  
 03: PF male  
 07: NPT male  
 40: 5 kg/cm<sup>2</sup>  
 42: 10 kg/cm<sup>2</sup>  
 48: 150 Lbs  
 49: 300 Lbs  
 57: PN10  
 58: PN16

(Next page)



# ORDER INFORMATION

SEX2 <sup>05</sup> <sup>06</sup> <sup>07</sup> <sup>08</sup> <sup>09</sup> <sup>10</sup> <sup>11</sup> <sup>12</sup> <sup>13</sup> <sup>14</sup> <sup>15</sup> <sup>16</sup> <sup>17</sup> <sup>18</sup> <sup>19</sup> <sup>20</sup> <sup>21</sup> <sup>22</sup> <sup>23</sup> <sup>24</sup> <sup>25</sup> <sup>26</sup>

<sup>18</sup> **Paddle model**

- A: None
- G: PC; Cross type
- H: PC; Scimitar type 120x98(WxH)
- I : SUS; 100x30(WxH)
- K: SUS; Folding type 80x20(WxH)

<sup>19</sup> <sup>20</sup> <sup>21</sup> <sup>22</sup> **Length**

Code	Length range
0001~400	0001~400mm

<sup>23</sup> <sup>24</sup> <sup>25</sup> <sup>26</sup> **Cable wire length**

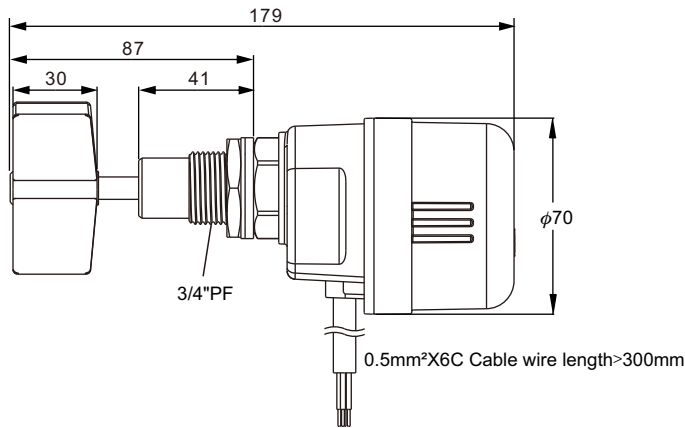
Code	Length range
0300~5000	0300~5000mm

## MINI TYPE(ECONOMY)

- **Power source** : (A)110Vac,(B)220Vac,  
(D)24Vac, 50/60Hz
- **Power consumption** : 1.5W
- **Contact capacity** : 3A/250Vac, 3A/30Vdc
- **Rotary speed** : 1R.P.M.
- **IP rating** : IP65
- **Housing material** : Plastic cover
- **Ambient temperature** : -20°C ~ 80°C
- **Cable length** : 300mm (available for custom length)
- **Material density** : 0.3 g/cm<sup>3</sup>

### STANDARD SE290 A/B/D

- Operation temperature: -20°C ~ 80°C
- Paddle material: PC



## MODEL NUMBER / ORDER CODE COMPARISON TABLE

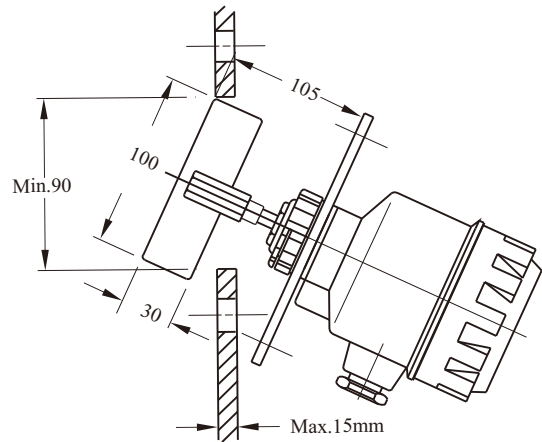
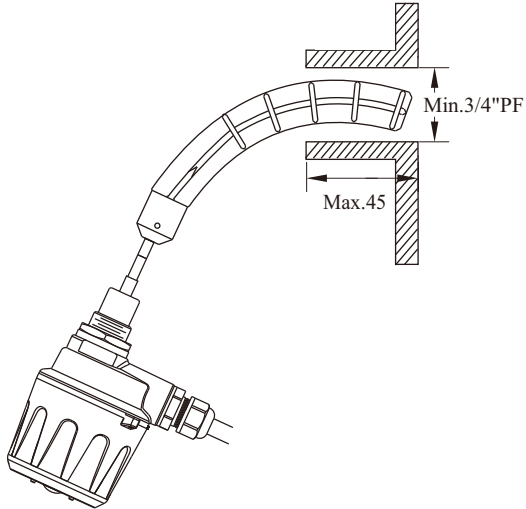
Model Number	Order Code
SE290A	SEX40000-CAA
SE290B	SEX40000-CAB
SE290C	SEX40000-CAC
SE290D	SEX40000-CAD



# MOUNTING EXAMPLES

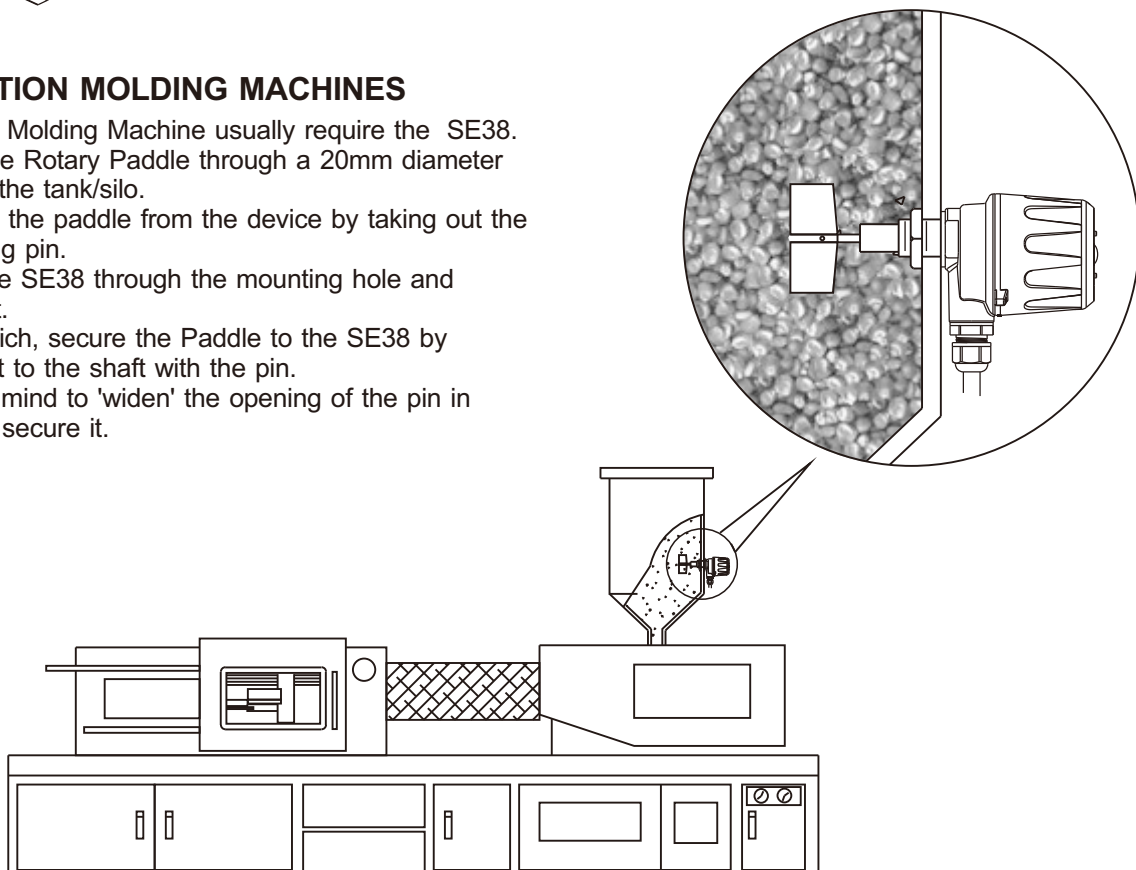
Regular models such as the SE11 should be installed directly on the tank side. Mount at a 35° angle the blade through the tank opening or hole sliding the blade in first.

\* The SE170 series minimum hole size should be 95mm in diameter. The scimitar model is directly installed on the tank wall method as shown below. (Assuming an arc-shaped tank with a 3/4" connection) and then screwing it tight.

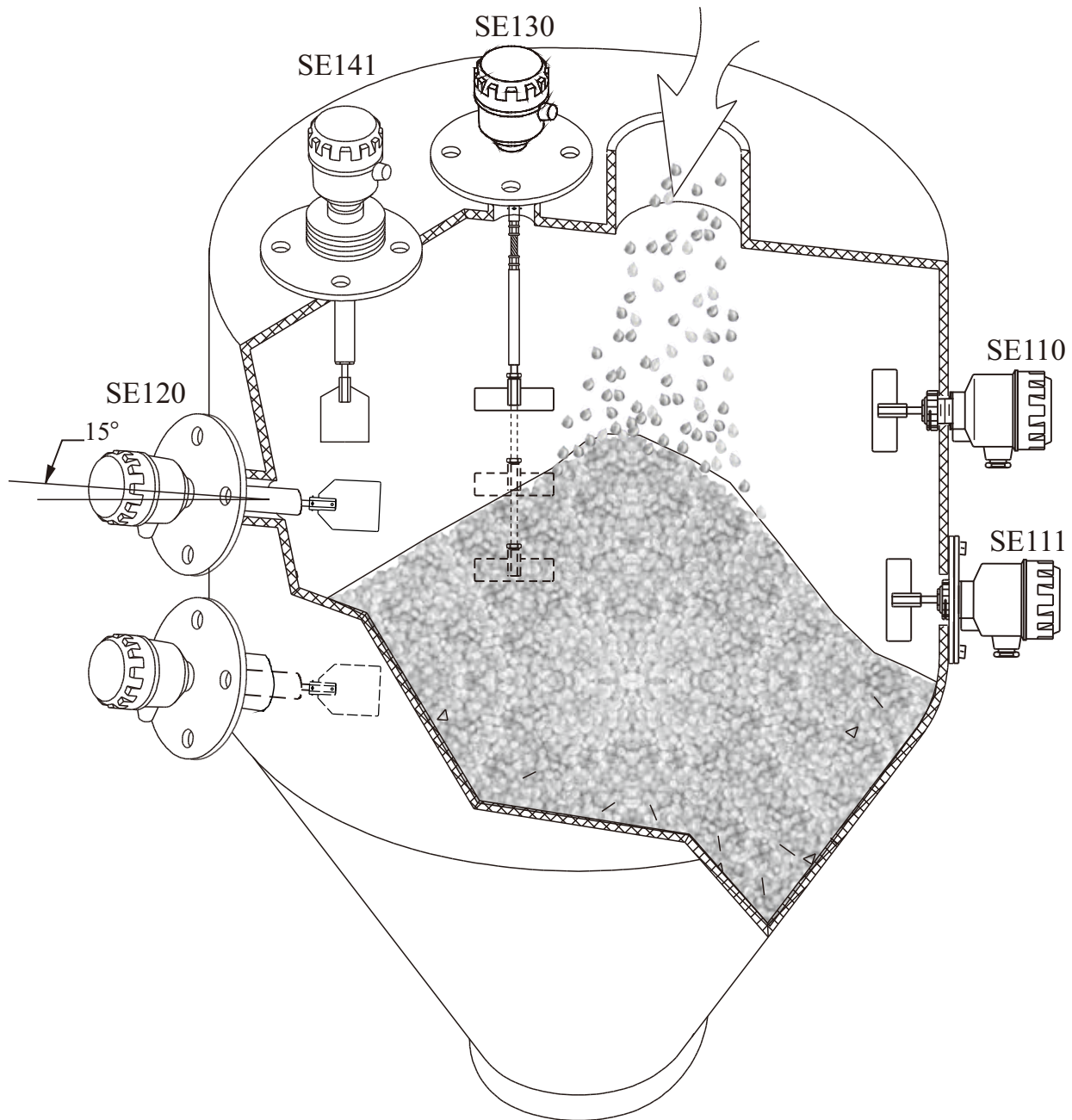


## INJECTION MOLDING MACHINES

Injection Molding Machine usually require the SE38. Install the Rotary Paddle through a 20mm diameter hole on the tank/silo. Remove the paddle from the device by taking out the fastening pin. Insert the SE38 through the mounting hole and tighten it. After which, secure the Paddle to the SE38 by locking it to the shaft with the pin. Keep in mind to 'widen' the opening of the pin in order to secure it.



## EXAMPLES



### INSTALLATION NOTICES

1. Side mount the sensor at a downward angle of  $15^{\circ}$  ~  $20^{\circ}$  to decrease the material inflow impact.
2. For high temperature application (more than  $70^{\circ}\text{C}$ ), please use the SE14□ Series.
3. For SE110~SE140 using a 1" inlet, please apply the scimitar model and screw directly.
4. For SE130, SE146 series have flexible and extendible shafts.
5. Please ensure the lead wire enters the housing from the bottom and the nuts are fastened to secure the device.

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