# - Series 7700 Displacer Operated 

## Level Control Internal Top Mounted Single Stage

## Description

Series 7700 displacer operated level controls are suitable for a wide range of applications on open or pressurized vassels of all dimensions: the use of displacers allows for wide switching differential, field adjustable switching points and use on high pressure applications. The single stage series are equipped with a single switch mechanism and are available with narrow or wide switching differential. The narrow range models are factory set to work with a fixed differential ( 40 mm average) slightly variable according to the liquid specific gravity: the switching level can be adjusted readily by changing the displacer position on the suspension cable. The wide switching differential models are fitted with two separate displacers for rising or falling level; by changing the relative position of the displacers on the cable the differential setting as well as the switching level can be adjusted.
The carbon steel connection to the vessel can be screwed 3" NPT or flanged 3" ANSI 150 as standard; the trim is in AISI 316 stainless steel, the attraction sleeve in series 400 AISI stainless steel and the displacer spring is in INCONEL. The displacer can be supplied in AISI 316L or in porcelain with AISI 316 suspension cable 3 meters long.

## Use

This device should be considered a component used to control level and should not be considered a safety device.
These products are designed and constructed in accordance with the directive 2014/68/EU and are not C $\in$ marked because they are not considered to be operating under pressure.

## Switch Selection

To select the correct model according to the operating conditions and the data on the liquid whose level has to be controlled refer to the table below and see bulletin 7A.100-E to select the switch mechanism and housing.


## Options and Special Features

- AISI 316 process connection
- Special corrosion resistant materials
- Shielded attraction sleeve
- Extra lenght suspension cable (up to 15 m )
- Interface control setting


## Specifications

| Maximum pressure: 70 bar at $250^{\circ} \mathrm{C}$ (with porcelain displacers)/ 40 bar at $250^{\circ} \mathrm{C}$ (with stainless steel displacers) On the flanged process connection models the maximum pressure can be limited by the flange rating and its material of construction. |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Model | Switch Function | Process Connection | Displacer Material (2) | Minimum specific gravity related to the process temperature <br> (1) $\left(\mathrm{kg} / \mathrm{dm}^{3}\right)$ |  |  |  |  |  |
|  |  |  |  | $40^{\circ} \mathrm{C}$ | $100^{\circ} \mathrm{C}$ | $150{ }^{\circ} \mathrm{C}$ | $200^{\circ} \mathrm{C}$ | $250{ }^{\circ} \mathrm{C}$ |  |
| 7701 | Narrow Different. (fixed) | Screwed | Porcelain | 0.50 | 0.60 | 0.60 | 0.70 | 0.70 |  |
| 7702 |  |  | Stain. Steel |  |  |  |  |  |  |
| 7703 |  | Flanged | Porcelain |  |  |  |  |  |  |
| 7704 |  |  | Stain. Steel |  |  |  |  |  |  |
| 7705 | Large Different. (adjust.) | Screwed | Porcelain | 0.60 | 0.70 | 0.70 | 0.80 | 0.90 |  |
| 7706 |  |  | Stain. Steel | 0.60 | 0.70 | 0.70 | 0.70 | 0.70 |  |
| 7707 |  | Flanged | Porcelain | 0.60 | 0.70 | 0.70 | 0.80 | 0.90 |  |
| 7708 |  |  | Stain. Steel | 0.60 | 0.70 | 0.70 | 0.70 | 0.70 | Mod. 7703-7704-7707-7708 |

Note: (1) The single stage narrow differential model can operate with all values of specific gravity from the minimum in the table to the maximum of $2 \mathrm{~kg} / \mathrm{dm}^{3}$ and to a maximum of $1.2 \mathrm{~kg} / \mathrm{dm}^{3}$ for the large differential types: the latter type can accept from the setting, liquid specific gravity alteration of $\pm 20 \%$ and temperature deviation of $\pm 25^{\circ} \mathrm{C}$.
(2) Porcelain displacers can be used up to a maximum temperature of $95^{\circ} \mathrm{C}$ in pressurized vessels containing water or condensate.

## Switching Levels $(\mathrm{mm})$ as a function of Specific Gravity and Temperature

| Mod. 7701 - Mod. 7703 | Specific Gravity | $40^{\circ} \mathrm{C}$ |  | $100^{\circ} \mathrm{C}$ |  | $150^{\circ} \mathrm{C}$ |  | $200^{\circ} \mathrm{C}$ |  | $250{ }^{\circ} \mathrm{C}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | B | C | B | C | B | C | B | C | B | C |
|  | 0.50 | 51 | 63 | -- | -- | -- | -- | -- | -- | -- | -- |
|  | 0.60 | 72 | 55 | 56 | 73 | 46 | 84 | -- | -- | -- | -- |
|  | 0.70 | 87 | 49 | 73 | 64 | 64 | 74 | 56 | 83 | 47 | 92 |
| High B | 0.80 | 98 | 45 | 86 | 58 | 78 | 66 | 71 | 74 | 63 | 83 |
| 190 level | 0.90 | 106 | 41 | 96 | 53 | 89 | 60 | 83 | 68 | 76 | 75 |
|  | 1.00 | 113 | 39 | 104 | 49 | 98 | 56 | 92 | 62 | 86 | 69 |
| 7 | 1.10 | 119 | 37 | 110 | 46 | 105 | 52 | 99 | 58 | 94 | 64 |
|  | 1.20 | 124 | 35 | 116 | 43 | 111 | 49 | 106 | 54 | 101 | 60 |
| Mod. 7702 - Mod. 7704 | Specific Gravity | $40^{\circ} \mathrm{C}$ |  | $100^{\circ} \mathrm{C}$ |  | $150^{\circ} \mathrm{C}$ |  | $200^{\circ} \mathrm{C}$ |  | $250{ }^{\circ} \mathrm{C}$ |  |
|  |  | B | C | B | C | B | C | B | C | B | C |
|  | 0.50 | 49 | 61 | -- | -- | -- | -- | -- | -- | -- | -- |
|  | 0.60 | 71 | 53 | 54 | 71 | 43 | 83 | -- | -- | -- | -- |
| $190 \xrightarrow{\substack{\text { Mign } \\ \text { level } \\ \text { Lever } \\ \text { level }}}$ | 0.70 | 86 | 47 | 72 | 63 | 63 | 73 | 54 | 82 | 45 | 92 |
|  | 0.80 | 98 | 42 | 85 | 56 | 77 | 65 | 70 | 73 | 62 | 82 |
|  | 0.90 | 107 | 39 | 96 | 51 | 89 | 59 | 82 | 66 | 75 | 74 |
|  | 1.00 | 114 | 36 | 104 | 47 | 98 | 54 | 92 | 61 | 85 | 68 |
|  | 1.10 | 120 | 34 | 111 | 44 | 105 | 50 | 100 | 56 | 94 | 62 |
|  | 1.20 | 125 | 32 | 117 | 41 | 112 | 47 | 106 | 52 | 101 | 58 |

Mod. 7705 - Mod. 7707


| Specific <br> Gravity | $\mathbf{4 0}^{\circ} \mathbf{C}$ |  | $\mathbf{1 0 0 ^ { \circ }} \mathbf{C}$ |  | $\mathbf{1 5 0}^{\circ} \mathbf{C}$ |  | $\mathbf{2 0 0}{ }^{\circ} \mathbf{C}$ |  | $\mathbf{2 5 0}{ }^{\circ} \mathbf{C}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\mathbf{B}$ | $\mathbf{C}$ | $\mathbf{B}$ | $\mathbf{C}$ | $\mathbf{B}$ | $\mathbf{C}$ | $\mathbf{B}$ | $\mathbf{C}$ | $\mathbf{B}$ | $\mathbf{C}$ |
| $\mathbf{0 . 6 0}$ | 65 | 51 | -- | -- | -- | -- | -- | -- | -- | -- |
| $\mathbf{0 . 7 0}$ | 104 | 43 | 80 | 72 | 65 | 91 | -- | -- | -- | -- |
| $\mathbf{0 . 8 0}$ | 133 | 38 | 112 | 63 | 99 | 79 | 86 | 95 | -- | -- |
| $\mathbf{0 . 9 0}$ | 155 | 34 | 137 | 56 | 125 | 70 | 114 | 85 | 102 | 99 |
| $\mathbf{1 . 0 0}$ | 174 | 30 | 157 | 51 | 146 | 63 | 136 | 76 | 125 | 89 |
| $\mathbf{1 . 1 0}$ | 188 | 28 | 173 | 46 | 164 | 58 | 154 | 69 | 145 | 81 |
| $\mathbf{1 . 2 0}$ | 201 | 25 | 187 | 42 | 178 | 53 | 169 | 63 | 161 | 74 |
| $\mathbf{1 . 2 0}$ | 125 | 32 | 117 | 41 | 112 | 47 | 106 | 52 | 101 | 58 |

Mod. 7706 - Mod. 7708


| Specific <br> Gravity | $\mathbf{4 0}^{\circ} \mathbf{C}$ |  | $\mathbf{1 0 0}^{\circ} \mathbf{C}$ |  | $\mathbf{1 5 0}^{\circ} \mathbf{C}$ |  | $\mathbf{2 0 0}{ }^{\circ} \mathbf{C}$ |  | $\mathbf{2 5 0}{ }^{\circ} \mathbf{C}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\mathbf{B}$ | $\mathbf{C}$ | $\mathbf{B}$ | $\mathbf{C}$ | $\mathbf{B}$ | $\mathbf{C}$ | $\mathbf{B}$ | $\mathbf{C}$ | $\mathbf{B}$ | $\mathbf{C}$ |
| $\mathbf{0 . 6 0}$ | 61 | 64 | -- | -- | -- | -- | -- | -- | -- | -- |
| $\mathbf{0 . 7 0}$ | 114 | 56 | 91 | 86 | 77 | 105 | 62 | 124 | 48 | 143 |
| $\mathbf{0 . 8 0}$ | 154 | 50 | 134 | 77 | 121 | 93 | 109 | 110 | 96 | 127 |
| $\mathbf{0 . 9 0}$ | 185 | 46 | 167 | 69 | 156 | 84 | 145 | 99 | 134 | 114 |
| $\mathbf{1 . 0 0}$ | 210 | 42 | 194 | 64 | 184 | 77 | 174 | 90 | 164 | 103 |
| $\mathbf{1 . 1 0}$ | 230 | 39 | 216 | 59 | 206 | 71 | 197 | 83 | 188 | 95 |
| $\mathbf{1 . 2 0}$ | 247 | 37 | 234 | 55 | 225 | 66 | 217 | 77 | 209 | 88 |
| $\mathbf{1 . 2 0}$ | 125 | 32 | 117 | 41 | 112 | 47 | 106 | 52 | 101 | 58 |

Note: for intermediate values of specific gravity and temperature between those indicated on the tables, B and C can be calculated by interpolating between the corresponding values at the conditions closest to those of service.
For specific gravity values not indicated on the tables, refer to the special instructions provided with the device.

## Model number code system

The model number for each control is determined by selecting three basic modules which describe a complete control. They are:
Model series (Sensing unit)
Switch mechanism/s
Switch housings
Each module has a corresponding numeric code wich, when combined toghether, forms the MODEL NUMBER. The model number coding arrangement is as follows


* When options are required, an S is added after the Switch Housing Code and the option required described.

Page 2 of 2

