Compatibility for EMC, climate and mechanical load
for valve’s drivers, controllers and transducers

Electronic drivers and transducers are the most critical valve’s components concerning the risk of electromagnetic interferences, water entrance and mechanical stress. As per applicable International Standards, the following tables summarize the environmental resistance features of Atos electronic devices:

- remote or integral to valve’s drivers and controllers
- LVDT spool position transducers
- proximity or position inductive switches
- pressure transducers

1 EMC ELECTROMAGNETIC COMPATIBILITY according to Directive 2014/30/UE

The EMC Directive identifies the ability of a device, equipment or system to function in an electromagnetic environment in a satisfactory manner (immunity), without produce intolerable electromagnetic interferences into any equipment in same environment (emission).

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 61000-6-2 (ex EN 50082-2)</td>
<td>Immunity for industrial environments</td>
</tr>
<tr>
<td>EN 61000-6-3 (ex EN 50081-1)</td>
<td>Emission standard for residential, commercial and light-industrial environments</td>
</tr>
<tr>
<td>EN 61000-6-4 (ex EN 50081-2)</td>
<td>Emission standard for industrial environments</td>
</tr>
</tbody>
</table>

2 IP PROTECTION DEGREE CLASSIFICATION according to CEI EN 60529

IP (Ingress Protection) coding system indicates the degree of protection provided by an enclosure against access to hazardous parts, against ingress of solid foreign objects, ingress of water and to give additional information in connection with such protection. The minimum ensured IP protection reported for each component is intended with relevant connectors correctly installed.

<table>
<thead>
<tr>
<th>Ingress protection</th>
<th>Protection against solid objects</th>
<th>Protection against liquids penetration</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP20</td>
<td>2 = protected against solid bodies of superior dimensions to 12 mm; protect against the access with a finger</td>
<td>0 = not protect</td>
</tr>
<tr>
<td>IP65</td>
<td>6 = totally protect against the powder; protect against the access with a wire</td>
<td>5 = protect against water jets</td>
</tr>
<tr>
<td>IP66</td>
<td>6 = protect against powerful water jets</td>
<td>6 = not protect</td>
</tr>
<tr>
<td>IP67</td>
<td>7 = protect against the effects of temporary immersion</td>
<td></td>
</tr>
</tbody>
</table>

3 MECHANICAL RESISTANCE TEST CONDITIONS according to CEI EN 60068-2-6 (Vibrations, Sine & Random) - CEI EN 60068-2-27 (Shock)

The Mechanical Resistance test determines the ability of components, equipment and other articles to withstand specified severities of sinusoidal/random vibration and shock.

<table>
<thead>
<tr>
<th>Test</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sine test</td>
<td>10 cycles 5-2000 Hz with logarithmic frequency variation 1 Octave/min 5-57 Hz amplitude 1.5 mm (p-p) 57-2000 Hz acceleration 10 g Tested on three axes X, Y, Z</td>
</tr>
<tr>
<td>Random test</td>
<td>20-2000 Hz spectral acceleration density 0.05 g²/Hz testing time 30 min. each axis Tested on three axes X, Y, Z</td>
</tr>
<tr>
<td>Shock test</td>
<td>Half sine wave shock 50 g / 11 ms Three tests for each axis, in positive and negative direction, for a total of 18 individual shocks Tested on three axes X, Y, Z</td>
</tr>
<tr>
<td>Shock test</td>
<td>Half sine wave shock 30 g / 11 ms Three tests for each axis, in positive and negative direction, for a total of 18 individual shocks Tested on three axes X, Y, Z</td>
</tr>
<tr>
<td>Sine test (old procedure)</td>
<td>0 = 63 Hz; 0.7 = 6 g</td>
</tr>
<tr>
<td>Shock test (old procedure)</td>
<td>Shock 50 g; impact time 11 ms</td>
</tr>
</tbody>
</table>
ELECTRONIC DRIVERS TYPE E-MI-AC analog, see table G010

- minimum ensured protection: IP65
- operating temperature: 0 ÷ +50 °C (storage: -20 ÷ +70 °C)

ELECTRONIC DRIVER TYPE E-MI-AS-IR digital, see table G020

- minimum ensured protection: IP65
- operating temperature: -30 ÷ +50 °C (storage: -25 ÷ +85 °C)

ELECTRONIC DRIVER TYPE E-MI-AC analog, see table G025

- minimum ensured protection: IP20
- operating temperature: -10 ÷ +60 °C (storage: -20 ÷ +70 °C)

ELECTRONIC DRIVER TYPE E-MI-AS digital, see table G030

- minimum ensured protection: IP20
- operating temperature: -20 ÷ +60 °C (storage: -25 ÷ +85 °C)

ELECTRONIC DRIVER TYPE E-MI-RES digital, see table GS205

- minimum ensured protection: IP20
- operating temperature: -20 ÷ +60 °C (storage: -25 ÷ +85 °C)

INTEGRAL ELECTRONIC DRIVERS TYPE E-RI-AEB(AES) digital, see table GS115
E-RI-AE analog, see table G110
E-RI-REB(RES) digital, see table GS205

- minimum ensured protection: IP67
- AE: operating temperature: -20 ÷ +60 °C (storage: -20 ÷ +70 °C)
- AEB(AES), REB(RES): operating temperature: -40 ÷ +60 °C (storage: -40 ÷ +70 °C)

Notes:
use of metallic connectors is strongly recommended in order to fulfill EMC requirements

(1) for AEB(AES) and REB(RES)
(2) only for AE
(3) for AES and RES with EH fieldbus interface
### INTEGRAL ELECTRONIC DRIVERS TYPE

**E-RI-TE(LE)** analog, see table **G200**  
**E-RI-TERS(AERS)** digital, see table **G205**

**minimum ensured protection:** IP67  
**E-RI-TE(LE)** operating temperature: -20 ÷ +60 °C (storage: -20 ÷ +70 °C)  
**E-RI-TERS(AERS)** operating temperature: -20 ÷ +50 °C (storage: -20 ÷ +70 °C)

**Note:** use of metallic connectors is strongly recommended in order to fulfill EMC requirements

### INTEGRAL ELECTRONIC DRIVERS/CONTROLLERS TYPE

**E-RI-TEB(LEB)** digital, see table **GS208**  
**E-RI-TES(LES)** digital, see table **GS210**  
**E-RI-TER(AERS)** digital, see table **GS212**  
**E-RI-TEZ(LEZ)** digital, see table **FS230**

**minimum ensured protection:** IP66 & IP67  
**operating** temperature: -40 ÷ +60 °C (storage: -40 ÷ +70 °C)

**Note:** use of metallic connectors is strongly recommended in order to fulfill EMC requirements

### EX-PROOF INTEGRAL ELECTRONIC DRIVERS TYPE

**E-RA-AES, E-RA-TE(LES) and E-RA-TERS(AERS)** digitals, see table **F650**

**minimum ensured protection:** IP66  
**operating / storage temperature:** refer to specific electronic driver type

**Note:** use of metallic connectors is strongly recommended in order to fulfill EMC requirements
VALVE'S POSITION TRANSDUCERS

**ETH*-4** (only for T valves)
- Minimum ensured protection: IP65
- Operating temperature: -20 °C to +70 °C (storage: -20 °C to +60 °C)

Applied to valves:
- DHZO, DKZOR, see table F165
- DLHZO, DLKZOR, see table F180
- QVHZO, QVKZOR, see table F412

**ETH*-8**
- Minimum ensured protection: IP67
- Operating temperature: -30 °C to +70 °C (storage: -30 °C to +60 °C)

Applied to valves:
- OPZ0-1", see table FS172 and F172
- DPZ0-1", see table FS175 and F175

**ETH-15**
- Minimum ensured protection: IP67
- Operating temperature: -40 °C to +70 °C (storage: -40 °C to +70 °C)

Applied to valves:
- OPZ0-1", see table FS172 and F172
- DPZ0-1", see table FS175 and F175

**E-THT-4** (only for T valves)
- Minimum ensured protection: IP65
- Operating temperature: -40 °C to +60 °C (storage: -40 °C to +70 °C)

Applied to valves:
- DKZOR, DLKZOR, QVKZOR

**E-THT-8**
- Minimum ensured protection: IP67
- Operating temperature: -30 °C to +70 °C (storage: -30 °C to +60 °C)

Applied to valves:
- OPZ0-1", see table FS172 and F172
- DPZ0-1", see table FS175 and F175

**E-THT-FV-10** (FV option)
- Minimum ensured protection: IP67
- Operating temperature: -40 °C to +60 °C (storage: -40 °C to +70 °C)

Applied to valve:
- DHE-06, DHE-08, DKE-16, see table ES010
- DPH*-16, DPH*-26, DPH*-46, see table ES030
- LIDA*, LIDAS*, see table ES120
- JO-DL, see table ES100

/FI option - valves
- Minimum ensured protection: IP67
- Operating temperature: -25 °C to +70 °C

EMC:
- IEC 60255-5 1kV
- IEC 61000-4-2 level 2
- IEC 61000-4-3 level 3
- IEC 61000-4-4 level 3

Shocks and vibration:
- IEC 60947-5-2 / 7.4

Applied to valves:
- DHE-06, DHE-08, DKE-16, see table ES010

/FI option - cartridges
- Minimum ensured protection: IP67
- Operating temperature: -25 °C to +80 °C

EMC:
- IEC 60947-5-2 / 7.2.3.1 1kV
- IEC 61000-4-2 level 2
- IEC 61000-4-3 level 3
- IEC 61000-4-4 level 3

Shocks and vibration:
- IEC 60947-5-2 / 7.4

Applied to cartridges:
- LIFI, see table ES120

**ZBE-06**

**E-THT-FV-20** (FV option)
- Minimum ensured protection: IP67
- Operating temperature: -40 °C to +60 °C (storage: -40 °C to +70 °C)

Applied to valve:
- DHE-07, DKE-17, see table ES010

/FI option - cartridges
- Minimum ensured protection: IP67
- Operating temperature: -25 °C to +80 °C

EMC:
- IEC 60947-5-2 / 7.2.3.1 1kV
- IEC 61000-4-2 level 2
- IEC 61000-4-3 level 3
- IEC 61000-4-4 level 3

Shocks and vibration:
- IEC 60947-5-2 / 7.4

Applied to cartridges:
- LIFI, see table ES120

**ZBE-08**

**VALVE'S PRESSURE TRANSDUCERS**

**E-ATR-8** (see table GS465)
- Minimum ensured protection: IP67
- Operating temperature: -40 °C to +100 °C (storage: -40 °C to +100 °C)

EMC:
- EN 61326 emission (group 1, class B)
- and immunity (industrial application)
- Shock test:
  - max 49g / 6ms
- Vibration:
  - 20...2000 Hz:
    - max 25g

Applied to valves:
- REB, RES with integral electronics

**E-ATRA-7** (see table GX800)
- Minimum ensured protection: IP67
- Operating temperature: -40 °C to +75 °C (T6), -40 °C to +102 °C (T4)
- Compensated temperature: 0 °C to +80 °C

EMC:
- EN 61326 emission (group 1, class B)
- and immunity (industrial application)
- Shock test:
  - max 1000g
- Vibration:
  - max 25g

Applied to valves:
- TERS with ex-proof integral electronics

**ZBE-06**

**E-THT-15**
- Minimum ensured protection: IP67
- Operating temperature: -40 °C to +70 °C (storage: -40 °C to +70 °C)

Applied to valves:
- OPZ0-1", see table FS172 and F172
- DPZ0-1", see table FS175 and F175

**E-THT-FV-10** (FV option)
- Minimum ensured protection: IP67
- Operating temperature: -40 °C to +60 °C (storage: -40 °C to +70 °C)

Applied to valve:
- DHI-06, DHE-06, DKE-16, see table ES010
- DPH*-16, DPH*-26, DPH*-46, see table ES030
- LIDA*, LIDAS*, see table ES120
- JO-DL, see table ES100

**ZBE-08**

**E-THT-FV-20** (FV option)
- Minimum ensured protection: IP67
- Operating temperature: -40 °C to +60 °C (storage: -40 °C to +70 °C)

Applied to valve:
- DHE-07, DKE-17, see table ES010

/FI option - valves
- Minimum ensured protection: IP67
- Operating temperature: -25 °C to +70 °C

EMC:
- IEC 60255-5 1kV
- IEC 61000-4-2 level 2
- IEC 61000-4-3 level 3
- IEC 61000-4-4 level 3

Shocks and vibration:
- IEC 60947-5-2 / 7.4

Applied to valves:
- DHE-06, DHE-08, DKE-16, see table ES010

/FI option - cartridges
- Minimum ensured protection: IP67
- Operating temperature: -25 °C to +80 °C

EMC:
- IEC 60947-5-2 / 7.2.3.1 1kV
- IEC 61000-4-2 level 2
- IEC 61000-4-3 level 3
- IEC 61000-4-4 level 3

Shocks and vibration:
- IEC 60947-5-2 / 7.4

Applied to cartridges:
- LIFI, see table ES120

**ZBE-06**

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