AMELEC SIGNAL CONDITIONING

# ADM270K Strain Gauge Transmitter / Isolator

- Non-Smart / Non-uProcessor based, Type A module
- Supply voltage: 24Vdc / 48Vdc/ 115Vac / 230Vac
- RFI protection to EN 61000-4-3:2006/A2:2010
- Amelec standard 10 year warranty
- Suitable for SIL 1, 2, & 3 rated (EN 61508-2) Safety System loop applications

## APPLICATION

- Weighing system for tanks, hoppers and silos
- Crane protection & control system
- Pressure sensor utilising strain gauges
- Float level meter utilising strain gauges
- Load cells utilising strain gauges

## TECHNICAL SPECIFICATION

## FUNCTION

Provides a DC output signal proportional to a bridge type strain gauge utilised in load cells and pressure transducers

## INPUT

Any mV signal range (Minimum span 4mV)
Excitation 10Vdc at up to 30mA as std.

## OUTPUT

DC current or voltage specified in the range of:
Current up to 100mA max in Sink configuration (externally powered)
Current up 22mA max in Source configuration (Internally powered)
Voltage source up to 20Vdc max
Typical output range: 4-20mA (max load 1200Ω)

## CONTROLS

Zero / Span: 15 turn blindset potentiometers.

## INDICATOR

Power ON: LED, Amber.

## PERFORMANCE

Accuracy/Linearity: < ±0.1%
Response time: < 200mS (0-100% step change)
Supply Consumption: < 3VA

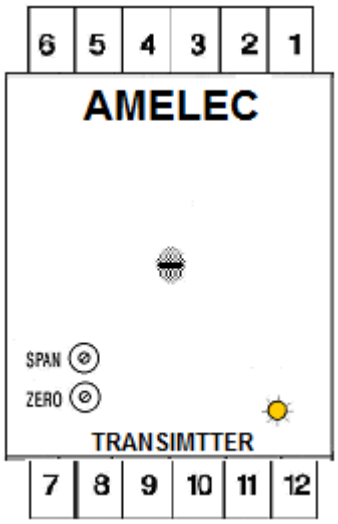
## PROTECTION

Input O/C drive Upscale as std, Downscale may be specified
Isolation: 500Vdc. Input/Output/Excitation/Supply/Earth
Internal Fuse.
Input over range up to typically 300%.
RF Immunity: 20MHz-3GHz/5.25GHz ≤10V/m, (80MHz-1GHz/5.6GHz ≤30V/m, 889MHz/1.75GHz ≤40V/m)

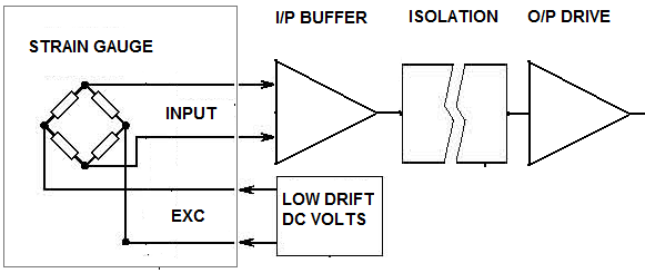
## TERMINATION

| | |
|---|---|
| INPUT + | 1 |
| IINPUT - | 2 |
| EXC + | 3 |
| EXC - | 4 |
| Scn | 5 |
| | 6 |
| OUTPUT + | 7 |
| OUTPUT - | 8 |
| Scn | 9 |
| Earth | 10 |
| Live / + | 11 |
| Neutral / - | 12 |

## FRONT VIEW




## FUNCTION BLOCK DIAGRAM




## ENVIRONMENTAL CONDITIONS

Storage temperature: -40 to +70℃
Operating Ambient: -15 to +55℃
Relative Humidity: 5 to 95% RH (Non-condensing)
EMC: 2014/30/EU, EN 61326-1:2013 (Generic Industrial levels)

## MOUNTING / DIMENSIONS

Enclosure: 50w x 75h x 182d mm
Mounting: Din Rail (TS35) or Surface by seismic Keyhole plate & Front of Panel mounting options available
Weight < 500g

## ADD ON / OPTIONS

DI: LCD or LED Display for local monitoring
P: Output Test Point
Non standard Power supply ranges available

sales@amelec-uk.com www.amelec-uk.com Tel: 00 44 (0)1908 567003

Issue 5: 05.19

# AD SERIES GENERAL SPECIFICATION

## INPUT DATA

**Input source**

For details see individual specification

**Open circuit response**

For details see individual specification.

**Input Impedance** (Voltage input)

>1Mohm at amplifier input. This will be shunted by burnout drive or input conditioning components.

## SUPPLY DATA

**Power supplies**

| | |
|---|---|
| AC models | 115 / 230 VAC ±20% |
| DC models | 24 / 48 VDC ±10% |
| 2 wire | 12- 60 VDC |

**Consumption**

| | |
|---|---|
| Transmitter / Trip amplifier | 3VA |
| 2 Wire transmitter | 250mW |

## OUTPUT DATA

**Output signals**

Standard units

Any constant current from 0-100uA to 0-20mA (at up to 20V loop) or any constant voltage from 0-1V to 0-10V (at up to 20mA loading).

**2-wire units**

4-20mA or 10-50mA as modulation of supply voltage.

**Response time**

<400mSec. Unless otherwise stated.

Typical response time for a Trip with 4-20mA input; <150uS for 1% step change and <100mS for 100% step change.

**Relay specification**

DP/DT or SP/DT for each trip, unless otherwise stated. Contacts are rated at 250 VAC, 2A, 100 VA (Resistive).

**Relay function**

Selected by PC link. Default is normally energised, relay to de-energise on trip (fail safe operation).

**Relay status**

Indicated by a red LED for each trip, mounted on the front panel. Lit when relay is energised.

**Controls**

| | |
|---|---|
| ZERO | ± 25% |
| SPAN | ± 50% |
| TRIP (When fitted) | 0-100% |
| DEADBAND (When fitted) | 1-20% |

## CONDITIONS

**Ambient temperature**

| | |
|---|---|
| Working | -20°C to +60°C |
| Storage | -40°C to +70°C |

**Humidity**

From 5% to 95% RH.

**Vibration**

1g at 15Hz to 150Hz.

## ELECTRICAL STANDARDS

**Insulation Input-output-contacts-earth**

1000V RMS continuous. 2000V for 2OuSec. Derate to 500VDC for option 'K' enclosures.

**Fusing**

Power supply fused.

## WIRING AND MOUNTING

**Terminals**

For conductors up to 2.5mm²

**Weight**

<1kg per module.

**Position**

Any position is acceptable.

**Mounting**

Standard units will fit onto a low profile 35mm DIN rail or be surface mounted by corner fixing holes. Option 'K' and 'DI' have enclosures suitable for Din rail, Surface or front of Panel mounting.

**Additional protection**

Enclosures are available to NEMA 12 oiltight, NEMA 4 watertight and IP54 for N-protection.

## PERFORMANCE

**Input/output linearity**

<0.1% error, unless otherwise stated

**Series mode rejection**

<01% error for 50Hz input at 5% of span amplitude.

**Common mode rejection**

<01% error for 250V RMS.

**Temperature effect on zero**

<0.02% per °C.

**Temperature effect on span**

<0.01% of span per °C or <0.1°C per °C, whichever is the greater.

**Temperature effect on suppression/elevation** <0.02% of suppression/elevation per °C.

**Supply voltage effect**

<0.01% per % input change.

**Trip adjustment**

By multiturn potentiometers, which are accessible through the front panel.

**Deadband**

Standard fixed 1%. Option adjustable from 1 to 20% span by multiturn potentiometer also available on request

**RFI rejection**

Standard units meet the CE requirements for use in Controlled Environments. For additional RFI protection, specify option 'K'.

**Permissible Input overload**

| | |
|---|---|
| mV input | 20V |
| DC voltage Input | 200V |
| DC current Input | 500% |
| AC voltage Input | 200% |
| AC current input | 500% |
| Resistance Input | 6V |

AMELEC SIGNAL CONDITIONING

# ADM270/ADM270K PROOF TEST / CALIBRATION CHECK PROCEDURE

## (mV Input /10Vdc Excitation, 4-20mA Output, 24V DC Supply)

***Even small voltages can cause potentially fatal shocks; this product is only to be tested by an electrically competent person.***

The ADM270 / ADM270K is a single channel strain gauge transmitter/isolator, please refer to the general data sheet for termination details. The output is adjustable via the Zero/Span multi-turn blindset potentiometers located through the unit front fascia. The instrument will have been factory calibrated and shouldn't require any further adjustments, however if you do need to check calibration or adjust the output then please follow the procedure below;

**Equipment required**

- A 24 volt dc power supply unit (PSU)
- A precision mV generator to simulate the input signal
- A digital multi-meter (DMM) to be able to measure the supply voltages and the current output
- Small instrument screwdriver with slotted flat blade head for any blindset potentiometer adjustments.

**Calibration check procedure**

1. Connect the 24Vdc power supply to the supply terminals as shown on the general data sheet**,** check the front fascia power ON LED illuminates and leave on for 20 minutes to allow the unit to acclimatise.
2. Connect the mV source to the input terminals as shown on the general data sheet.
3. Set the DMM to measure mA, and connect the DMM to the output terminals
4. Apply 0% (0V) of the input range from the mV source
5. Measure output on the DMM and check/adjust the Zero potentiometer to read 0% of range (4mA)
6. Change input mV source to 100% of the range
7. Measure output on the DMM and check/adjust the Span potentiometer to read 100% of range (20mA)
8. Repeat steps 4 to 7 until the output is calibrated accurately to within +/-0.1% of span
9. Measure the output at 25% steps of the mV input range to ensure the output is linear (8mA-12mA-16mA)
10. Apply 100% input, vary 24Vdc power supply by +/-10% (2**.**4V) and check output remains stable.
11. Open circuit the mV input and check that the output goes over range (>21mA)
12. Set DMM for measuring DC Voltage & check across Excitation output terminals for 10Vdc
13. Again vary 24Vdc power supply to the unit by +/-10% (2**.**4V) to check that the 10Vdc Excitation output remains stable.
14. End. Re-install unit to the plant safety loop wiring.
15. Should any of the above steps not be achievable, replace the suspect unit with a spare calibrated unit asap and contact AMELEC technical support team for further assistance.

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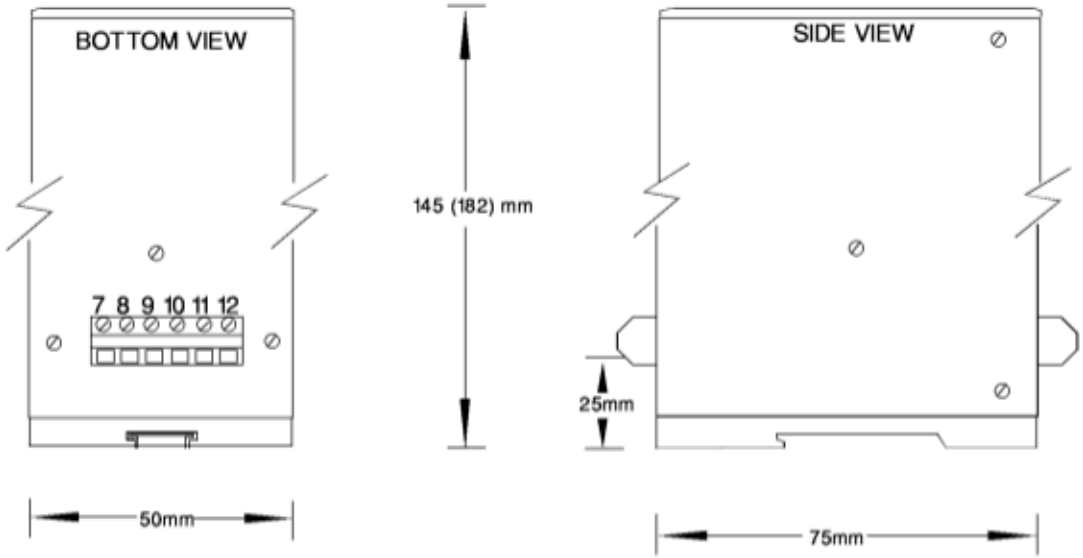
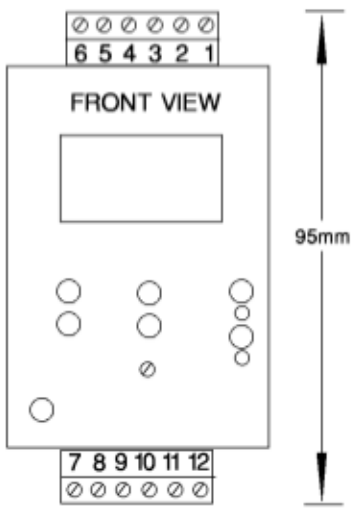
For more information and/or to discuss your application, please contact our technical staff at the factory in Milton Keynes;

**Postal address:** Cochran Close, Crownhill, Milton Keynes, Bucks. MK8 OAJ
**Tel:** 01908 567003 **Fax:** 01908 566735
**Email:** sales@amelec-uk.com

Issue 2: 2017



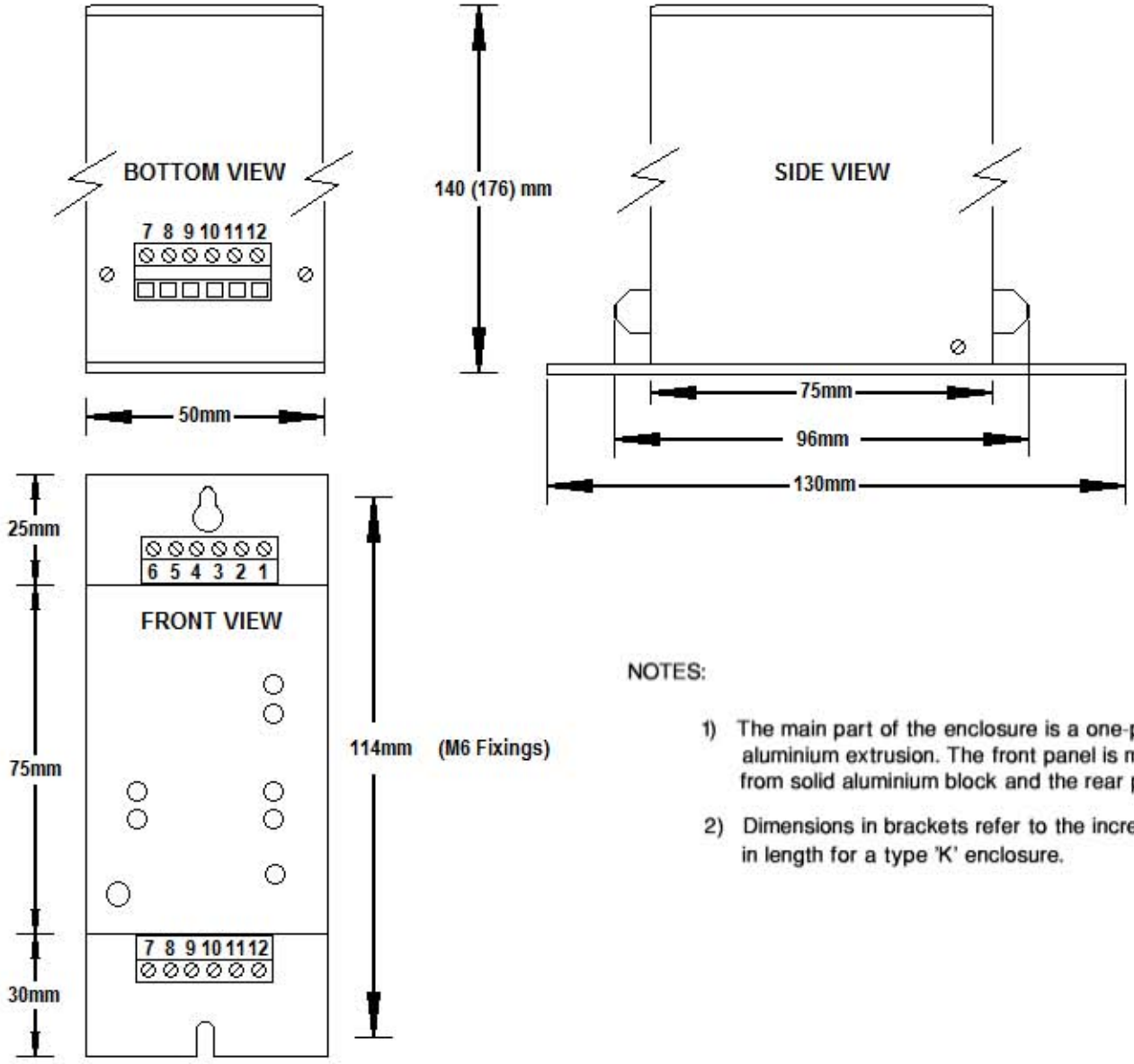




NOTES:

1) The main part of the enclosure is a one-piece aluminium extrusion. The front panel is machined from solid aluminium block. The rear is machined from Din rail extrusion.

2) Dimensions in brackets refer to the increase in length for a type 'K' enclosure.

| | | | | | |
|---|---|---|---|---|---|
| DIMENSIONS in mm<br>TOLERANCES ±<br>Nominal 0.4 mm<br>Decimal 0.15 mm<br>Unless shown otherwise | Drawn: SLK<br>Checked:<br>Approved:<br>Date: 11/7/00 | REVISION Redrawn 7/2000 | TITLE: Din Rail enclosure<br>Views of enclosure showing major dimensions.<br>Used on Assembly<br>AD series products | SCALE<br>N.T.S. | AMELEC INSTRUMENTS<br>Cochran Close, Presley Way<br>Crownhill, Milton Keynes, MK8 0AJ<br>DRAWING NO.<br>AD Din Enclosure<br>Sht 1 of 1 |

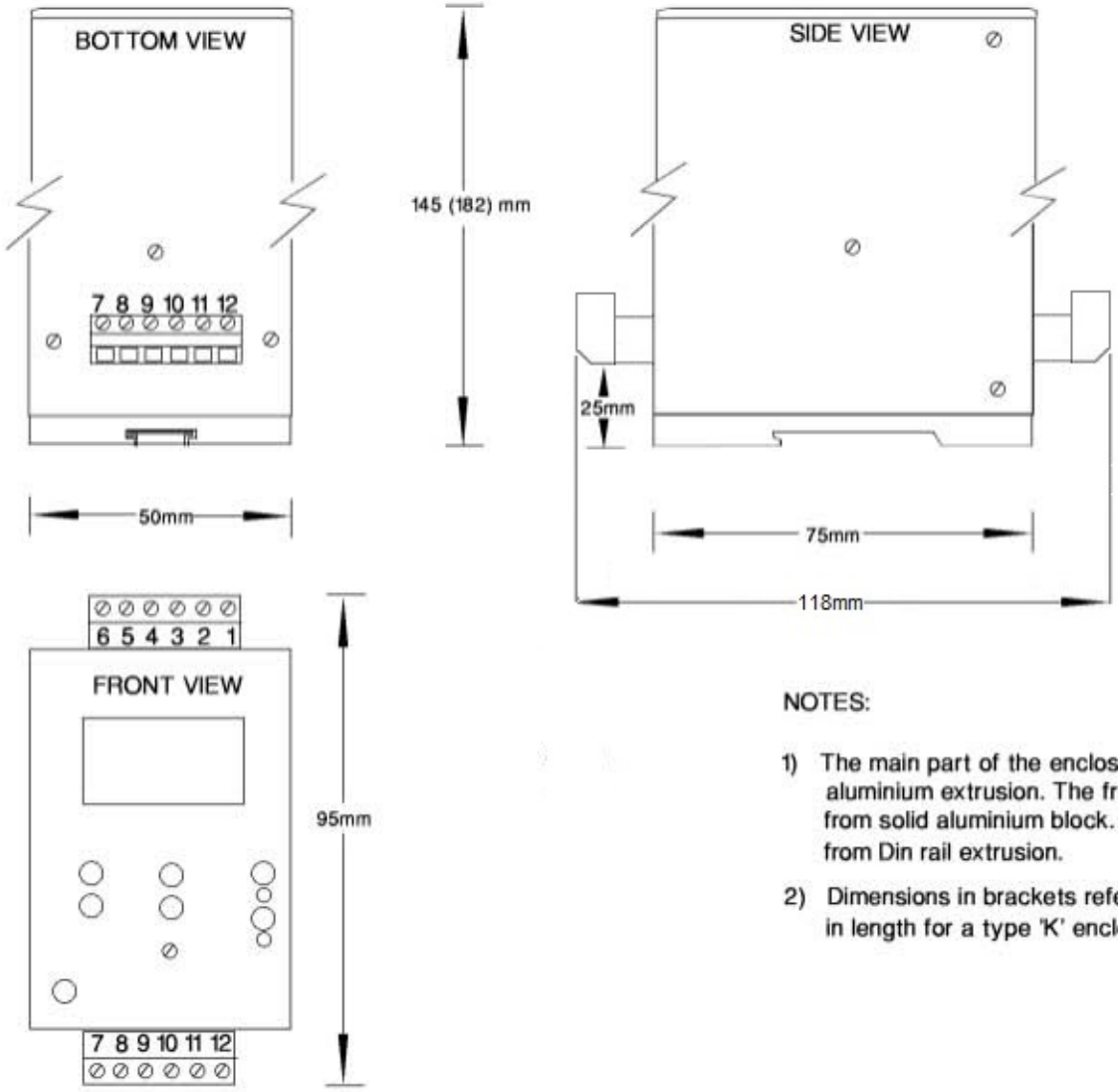



NOTES:

1) The main part of the enclosure is a one-piece aluminium extrusion. The front panel is machined from solid aluminium block and the rear panel from aluminium sheet.

2) Dimensions in brackets refer to the increase in length for a type 'K' enclosure.

| | | | | | |
|---|---|---|---|---|---|
| DIMENSIONS in mm<br>TOLERANCES ±<br>Nominal 0.4 mm<br>Decimal 0.15 mm<br>Unless shown otherwise | Drawn: SLK<br>Checked:<br>Approved:<br>Date: 5/7/00 | REVISION Redrawn 2/2015 | TITLE: Surface mounted Din enclosure<br>Views of enclosure showing major dimensions. | AMELEC INSTRUMENTS<br>Cochran Close, Presley Way<br>Crownhill, Milton Keynes, MK8 0AJ | |
| | | | Used on Assembly<br>AD series products | SCALE<br>N.T.S. | DRAWING NO.<br>AD Key enclosure<br>Sht 1 of 1 |




NOTES:

1) The main part of the enclosure is a one-piece aluminium extrusion. The front panel is machined from solid aluminium block. The rear is machined from Din rail extrusion.

2) Dimensions in brackets refer to the increase in length for a type 'K' enclosure.

| | | | | | |
|---|---|---|---|---|---|
| DIMENSIONS in mm<br>TOLERANCES ±<br>Nominal 0.4 mm<br>Decimal 0.15 mm<br>Unless shown otherwise | Drawn: SLK<br>Checked:<br>Approved:<br>Date: 11/7/00 | REVISION Redrawn 7/2000 | TITLE: Din Rail enclosure. Views of enclosure showing major dimensions with plug-in terminals.<br>Used on Assembly AD series products | SCALE N.T.S. | AMELEC INSTRUMENTS<br>Cochran Close, Presley Way<br>Crownhill, Milton Keynes, MK8 0AJ<br>DRAWING NO. AD Din Enclosure<br>Sht 1 of 1 |

AMELEC SIGNAL CONDITIONING

# Notes: Good Practice when installing any Din Rail mounted instrumentation

To increase the life expectancy of your din rail mounted instruments, it is recommended that the following guidelines are adhered to:

## Mounting Instruments along a Din Rail

Any signal conditioning/process control modules will contain electronic components and circuits which in certain conditions have to lose their excess energy as HEAT. Suppliers of such instruments cannot predict the site conditions or situations, so to make sure that hot spots do not occur it is recommended that electronic instruments are not bunched together horizontally in groups of more than FIVE units.

A space of 5-10mm every five units max will minimise any temperature rise within that group of instruments.

If mounted vertically it is recommend that no more than two instruments are stacked together, then with a minimum 5mm spacer between adjacent units/pairs.

## Cabling/Relay Transient Suppression

The electronics in process control units are generally mounted in a small enclosure, which by the very size means that the wiring entering and leaving each enclosure is physically close together. All wiring must be carried out in accordance with current BS EN / IEC regulations. To avoid interference from one port to another the following rules of thumb are recommended:

a) Power cables and wires that carry transients are routed separately to the signal wiring, ideally crossing at 90° to each other.

b) Low level signal cables are kept as screened &/or twisted pairs where possible. On screened cables only earth the screen at one end.

c) Relay contacts that switch inductive loads or other arcing devices should be suppressed, ideally at or across the inductance or other source.

On DC circuits a free wheeling diode should be used, it's PIV at least 4 times the working voltage.

On AC circuits use an RC network, the values of the R and C chosen to match the L and R value of the coil itself.

These rules are very general, so if you encounter any specific problems please contact our sales support team for further assistance.

## Amelec product

The Amelec Din Rail mounted instruments are available in a number of product packages:-

**The Plastic enclosures**; A variety, which may be supplied as either DIN rail or individually Surface mounting instruments. The AD, AEC or AS series' units can be clipped on to the TS35 rail, the ADG series units can be clipped on to either TS35 or G rail (light or heavy duty). The AD series units can also be surface mounted by utilising their corner fixing holes.

**The Metal enclosure;** is supplied as standard for DIN rail mounting (TS35 heavy duty rail). An optional rear Keyhole plate is available to surface mount the instrument for extra rigidity if required.

**The Panel mounted enclosure** is supplied in a metal enclosure. The panel cut out needs to be 51w x 76h mm (I.e. approx. 1mm more than the 50w x 75h mm enclosure extrusion dimensions). Two brackets from inside your panel secure the units as std. Optional front plate with corner fixing holes available if preferred.

# CE Declaration of Conformity

**The Manufacturer / Supplier of the products covered by this Declaration: -**

Amelec Instruments
Unit 5, Cochran Close,
Crownhill, Milton Keynes,
MK8 0AJ
Tel: 01908 567003
Fax: 01908 566735

## The Products Covered by this Declaration

Model No: ADM270K

## Conforms to applicable section of the following Directives / Standards:

EMC Directive 2014/30/EU Standard BS EN 61326-1: 2013 (Generic Industrial)

LVD Directive 2014/35/EU Standard BS EN 61010-1: 2010

## Attention!

The attention of the user is drawn to special measures and limitations to use, which must be observed when these products are placed into service to maintain compliance with the above directives. It is also assumed that a competent person will handle the product and that the standard industry practises will be applied. Signal cabling shall be routed separately to power carrying cabling (includes any relay output wiring). All signal cabling shall be screened. The screen shall only be terminated to the power earth terminal.

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**Signature:**  **Position:** Q A Manager **Date:** 20.04.16

**Name:** Mr B Sisodiya

AMELEC SIGNAL CONDITIONING

# RoHS DIRECTIVE (2011/65/EU) COMPLIANCE STATEMENT

**RoHS 3 directive Declaration:**

We declare that to the best of our knowledge products supplied either do not contain any of the substances listed below, or that it is within the allowable limits stated below if they do:

- Cadmium (Cd): 0.01%
- Mercury (Hg): 0.1%
- Lead (Pb): 0.1%
- Hexavalent chromium (Cr6+): 0.1%
- Polybrominated biphenyls (PBB): 0.1 %;
- Polybrominated diphenyl ethers (PBDE): 0.1 %
- Bis(2-Ethylhexyl) phthalate (DEHP): 0.1% (RoHS 3)
- Benzyl butyl phthalate (BBP): 0.1% (RoHS 3)
- Dibutyl phthalate (DBP): 0.1% (RoHS 3)
- Diisobutyl phthalate (DIBP): 0.1% (RoHS 3)

We fully support the RoHS directive that helps reduce risk to health and damage to the environment. Therefore, unless otherwise requested by the purchaser for equipment still exempted, we confirm that our processes are set up to meet the requirement of the RoHS 2 Directive 2011/65/EU / RoHS 3 Amendment Directive 2015/863/EU.

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Signed: 

Director

Issue 5a: 2021

| | | |
|---|---|---|
| Current issue date: | 1 January 2022 | Original approval(s): |
| Expiry date: | 31 December 2024 | ISO 9001 - 4 December 1997 |
| Certificate identity number: | 10405017 | |

# Certificate of Approval

This is to certify that the Management System of:

# Amelec Technical Solutions Ltd t/a Amelec Instruments

Unit 5 Cochran Close, Crowhill, Milton Keynes, MK8 0AJ, United Kingdom

has been approved by LRQA to the following standards:

## ISO 9001:2015

Approval number(s): ISO 9001 – 00002302

**The scope of this approval is applicable to:**

Design, customisation, manufacture and repair of signal conditioning equipment, transmitters, trip amplifiers and arithmetic units.

**David Derrick**

Area Operations Manager UK & Ireland

Issued by: Lloyd's Register Quality Assurance Limited

UKAS MANAGEMENT SYSTEMS 0001