

GUIDELINES

on

the Interpretation of

**The Electromagnetic
Compatibility Directive
And
The Low Voltage Directive**

for the
Valve and Actuator Industry
prepared by



The British Valve and Actuator Association

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**BVAA GUIDELINES ON THE INTERPRETATION OF
THE ELECTROMAGNETIC COMPATIBILITY DIRECTIVE
AND THE LOW VOLTAGE DIRECTIVE**

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EMC AND LV DIRECTIVES - GUIDELINES

1. Introduction

This guideline booklet is intended to give information and guidance on the interpretation of two important EC Directives for products using electrical energy and used in the Valve and Actuator Industry. Also included in this booklet is a section giving examples of the application of apparatus/equipment covered by these Directives when used as valve or actuator mounted instrumentation (see section 4).

These Directives are:

EMC **Electromagnetic Compatibility Directive**
89/336/EEC as amended by 92/31/EEC and
93/68/EEC

LVD **Low Voltage Directive 73/23/EEC as**
Amended by 93/68/EEC

It should be noted that EC Directives are subject to the force of law through legislation in the various Member States and, with effect from the implementation date of the relevant Directive, all products using electrical energy will have to comply with this legislation unless they are excluded from the particular scope.

Although these guidelines are restricted to the EMC and LV Directives, valve and actuator manufacturers should note that there will be situations where other Directives may have to be considered, e.g. Simple Pressure Vessels (87/404/EEC), Constructions Products (89/106/EEC), Machinery Directive* (89/392/EEC), Explosive Atmosphere Directive (94/9/EEC) and the Pressure Equipment Directive* (97/23/EC)

***Note: BVAA has already published interpretation guidelines on these Directives**

This information is given for guidance only and should be considered in conjunction with the appropriate Directives and the DTI Guidance Notes on the relevant UK regulations (see Bibliography)

EMCD THE ELECTROMAGNETIC COMPATIBILITY DIRECTIVE

2. Electromagnetic Compatibility Directive

This Directive is of major importance for electrically powered apparatus. Often EMC is considered something which is only important to audio and video equipment. However, the functioning of many products may be affected by electromagnetic disturbance or may be affected by electromagnetic disturbance or may cause the functioning of other products to be affected.

The EC has chosen to cover both of these aspects (immunity and emission) in one Directive

2.1 Effective Date

The EMCD came into force on 1 January 1993 and, following a transitional period for the EC Member States to produce their own national legislation/regulations, it became fully effective on **January 1st 1996**.

The UK has produced its own regulations which transfer the EMCD into UK law. These are entitled:

The Electromagnetic Compatibility Regulations* (SI 1992/2372) (see Bibliography)

The Electromagnetic (Amendment) Regulations (SI 1994/3080)

****Note: The UK regulations often give more details about the Directive***

2.2 Definition of Apparatus

This is defined as:

Apparatus means all electrical and electronic appliances together with equipment and installations containing electrical and/or electronic components

2.2.1 **BVAA Interpretation of Apparatus**

This Directive typically* applies to the following valve/actuator industry products where “intolerable” electromagnetic disturbances might occur:

- Electric motor driven actuators
- Solenoid valves
- Servo valves
- Electro pneumatic positioners
- Electrical (analogue or digital) positioners
- Electro pneumatic transducers
- Electrical transmitters
- Linear/rotary variable differential transformers

***Note:** *The list of typical items is not intended to be exhaustive but is given only as an example for purposes of clarification*

2.3 **List of Exclusions**

The EMCD defines the following exclusions:

- Exports to third countries
- Spare parts (components)
- Electromagnetically “benign” apparatus
- Apparatus in a sealed electromagnetic environment
- Amateur radio apparatus
- Military equipment

2.3.1 **BVAA Interpretation of Exclusions**

Typical ⁽¹⁾ excluded ⁽²⁾ apparatus includes the following:

- Limit switches
- Isolating switches
- Proximity switches (non-inductive type)
- Thermostats
- Potentiometers
- Junction boxes
- Conduit/cable glands

Notes:

⁽¹⁾ *The list of typical items is not intended to be exhaustive but is given only as an example for purposes of clarification.*

⁽²⁾ *The examples given of excluded apparatus are on the basis that they are “benign” according to the Directive (see 2.3)*

2.4 Definition of EMC

The Directive provides the following definition:

Electromagnetic compatibility means the ability of a device, unit of equipment or system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment.

2.4.1 BVAA Interpretation

- (a) Electrical equipment, etc., shall not be affected by or cause electromagnetic interference within prescribed limits.
- (b) Guidance on what is intended by “intolerable” can be obtained from Relevant standards (see Note to 2.5)

2.5 Methods of Complying with the EMCD

There are two principal routes to follow to enable valve and actuator manufacturers to demonstrate conformance of their products with this Directive:

- 2.5.1 (a) **Standards route** – the product is manufactured and tested in accordance with a relevant Harmonised European standard and the manufacturer assesses conformity of his product with this standard and produces an EC declaration of conformity. There is no requirement for independent third party involvement and the manufacturer can consequently “self certify” his product.

A list of some relevant harmonised standards is given below:

Series	Title of Standard
*BS EN 50081/1	Radiated and conducted RF voltage emissions
*BS EN 60555/2	Conducted harmonic emissions
*BS EN 500082	Generic immunity
BS EN 61000	EMC and test methods
BS EN 60801	EMC for industrial process measurement and control equipment

***Note:** *These “generic” standards are applicable to all products to be used in a given environment and define a set of detailed and essential EMC requirements as well as limiting values and test procedures*

- 2.5.2 (b) **Technical Construction File route** – the manufacturer prepares a full Technical Construction File giving details of how his product has to be manufactured to be in conformity with the EMCD. This Technical Construction File should be in accordance with the Directive and has to be submitted to a competent body for assessment (i.e. non-self certification).

.....
***It is mandatory that a declaration of conformity is produced
for both of the above routes***
.....

2.5.3 According to the DTI Guidelines Ref. URN 95/683 the **EC Declaration of Conformity**, if issued in the UK, shall:

- be in English;
- give the name and address of the responsible person and, if the responsible person is not the manufacturer, the details of the manufacturer;
- be signed by or on behalf of the manufacturer or his authorised representative and identify that signatory;
- bear the date of issue;
- give particulars of the apparatus to which it relates sufficiently to identify it;
- state the numbers and titles of the applicable EMC standards applied by the manufacturer;
- certify that the apparatus to which the declaration relates conforms with the protection requirements of the EMC Directive;
- be kept for ten years after the last production *and*
- modified (redeclared) following major changes to the product.

When the Technical Construction File route is used please note that the declaration of conformity must also include identification of the Technical Construction File relating to the apparatus and include the name and address of the competent body which issued the report for the Technical Certificate and the date and any number thereof.

2.5.4 ***BVAA Recommendation***

It is recommended that the valve/actuator industry follow route (a) and work to relevant Harmonised European standards. This route allows the manufacturer (or his authorised representative established within the EC) to “self certify” by producing an “EC declaration of conformity” in line with the Directive (see example in Appendix 4). This declaration must be available for customer reference and reproduction if required.

The empowered signatory of the declaration of conformity would normally be a member of senior management with executive responsibilities. In the event of failure of a product supplied under the EMC the legal obligations can be very serious and the empowered signatory may be personally liable. Manufacturers should ensure that they have sufficient product liability insurance cover.

A further recommendation is that unless manufacturers have the sophisticated, and often expensive, test equipment which may be required to carry out the EMC tests prescribed in the standards, they should employ the services of a suitable UKAS (United Kingdom Accreditation Service) accredited test laboratory (see Bibliography).

UKAS takes over the work of both NAMAS (National Measurement Accreditation Service) and NACCB (National Accreditation Council for Certification Bodies). Any approvals obtained from such accredited test laboratories are fully acceptable throughout the EC without the need for re-testing in the country of purchase of the apparatus.

2.5.4 Demonstrating Compliance

The procedure for demonstrating compliance with the EMCD via 2.5.1 (route a) is represented in flow chart form in figures 1 and 2 which deal with initial approvals and changes in design respectively (see Appendices 1 and 2).

2.6 Marking

For both routes (see 2.5) to be in compliance with the EMCD, the product must comply with the CE Marking Directive (93/68/EEC). This requires the “affixation” of the official CE Mark to the apparatus or if not possible to the:

packaging
and/or instructions for use
and/or guarantee certificate

2.6.1 BVAA Recommendation

The BVAA recommends that wherever possible apply the CE Mark to all of the above locations since this might avoid unnecessary delay in transport, particularly when sold in EC countries other than the UK.

The CE Mark is an official symbol as shown below:



The actual shape and dimensions of this mark must conform to the requirements given in the Official Journal of the European Communities No. L220/7 dated 30/8/92 (see Appendix 3).

IMPORTANT NOTE:

The CE Mark may only be affixed if the apparatus complies with all the Directives which are applicable for the product concerned. Only one CE Mark need be affixed.

The manufacturer is responsible for identifying all such Directives.

2.7 Language

2.7.1 The EMC directive makes reference only to the equipment “operating instructions” being printed in the language of the end user. Declaration of conformity or incorporation need only be in the language of the manufacturer.

2.7.2 BVAA Recommendation

Operating instructions should be printed in the language of the equipment end user. It may also be considered good exporting practice to print any maintenance manuals in the language of the end user.

LVD The Low Voltage Directive

3. This Directive is of major importance for electrically powered equipment operating within the prescribed limits as detailed below (see 3.2). It is principally concerned with the safety of persons, domestic animals and property when the equipment is used in applications for which it was manufactured and installed as instructed.

****Note: Manufacturers should recognise the importance of including warnings of misuse in appropriate instruction manuals/leaflets.***

3.1 Effective Date

This Directive first came into force in August 1974 but was subsequently amended in 1993 by EC Directive 93/68/EEC. This amendment effectively updated the original LVD into a “New Approach” type Directive and as a consequence CE Marking is now required for all electrical products within the scope of the LVD. The amendment came into force in January 1995 with a transitional period for Member States to produce their own National legislation/regulations to be fully effective from **1st January 1997**.

The UK regulations relevant to the LVD are given in:

3.2 Definition of Low Voltage

Article 1 of the Directive defines the scope as any electrical equipment within the limits of:

50 volts a.c. to 1000 volts a.c.
75 volts d.c. to 1500 volts d.c

3.2.1 BVAA Interpretations

- (a) The term “electrical equipment” for valve/actuator products is synonymous with the term “apparatus” as given in the EMCD (see 2.2)
- (b) Certain valve/actuator industry equipment is excluded from the LVD, e.g. 24 volt supply equipment.

3.3 Methods of Complying with the LVD

To comply with the LVD, it is necessary to design and manufacture in accordance with the Electrical Equipment Safety Regulations 1994. Electrical equipment which complies with the safety provisions of a Harmonised European standard will be presumed to comply with the safety requirements of the 1994 regulations.

Where no suitable Harmonised European standard exists then reference can be made to an ISO standard or, where non exists, to a national standard.

3.3.1 BVAA Recommendation

Unlike the EMCD, there does not exist any entirely suitable Harmonised standard which is directly applicable to the electrical valves/actuators used in our industry.

The best reference we can make is to:

EN 60730:1992 *Specification for Automatic Electrical Controls for household and similar use.*

This standard includes linear and rotary actuators and is designed to protect people and property in a way which meets the requirements of the LVD. Some of the requirements of this standard may not be relevant to valves/actuators – this must be assessed and the relevance recorded in the Technical Documentation.

In referring to EN 60730, in the absence of any other relevant standard, it is considered that the manufacturer can demonstrate diligence concerning the safety requirements of the LVD.

3.4 Demonstrating Compliance

Having satisfied the above, Article 13 of the amending Directive (see 3.1) contains the following requirements for demonstrating conformity with the Directive:

- (a) CE Marking – there is no change to the essential requirements concerning CE Marking (see 2.6). However CE Marking is required **no later than 1st January 1997**.
- (b) EC declaration of conformity. This allows the manufacturer to “self declare” conformity with the Directive and, if issued in the UK shall:
 - be in English;
 - give the name and address of the responsible person and, if the responsible person is not the manufacturer, the details of the manufacturer;
 - be signed by or on behalf of the manufacturer or his authorised representative and identify that signatory
 - bear the date of issue;
 - give particulars of the apparatus

- state the numbers and titles of the relevant LV standards applied by the manufacturer;
 - certify that the apparatus to which the declaration relates conforms with the protection requirements of the LV Directive:
 - be kept for ten years after the last production *and*
 - modified (re-declared) following major changes to the product.
- (c) Technical Documentation. This should include the following:

PART A

- name and address of manufacturer;
- list of Harmonised standards or solution adopted to satisfy objectives;
- description of product;
- operating instructions;
- overall plan of the product;
- declaration of conformity

PART B

- test reports
- information of quality control:
- full description of product;
- details of standards applied etc.

3.4.1 BVAA Recommendations

- (a) CE Marking – refer to 2.6
- (b) Declaration of Conformity – should follow the style/format given in EN 45014:1993: *General criteria for supplier declaration of conformity*. A typical example of a declaration of conformity is shown in Appendix 4.

The empowered signatory of the declaration of conformity would normally be a member of senior management with executive responsibilities. In the event of failure of a product supplied under the LVD, the legal obligations can be very serious and the empowered signatory may be personally liable. Manufacturers should ensure that they have sufficient product liability insurance cover.

- (c) Technical Documentation – the prime purpose of which is to demonstrate conformity with the Directive to be assessed. It shall cover “as far as relevant for such assessment” the design, manufacture and operation of the product.

The Technical documentation can exist in the following way:

- does not necessarily need to be in one complete document: it can be a collection of separate documents. It could be a compilation of documents which already exist within the manufacturer's system;
- shall be accepted in the mother language of the manufacturer;
- does not need to be supplied to anyone;
- information from this file or access to the file must be available to an enforcement authority with a specific concern about conformity with the LVD. (Example: in the UK this would be the Trading Standards Department)].

4. Examples of apparatus/equipment covered by the EMCD and LVD

4.1 Examples of configurations of valves/actuators with or without electrical apparatus/equipment are given in Appendices 5, 6 7 and 8.

5. Assembled apparatus/ancillaries

When the valve, actuator and all ancillary electrical apparatus forms one complete unit, the supplier of the complete unit should have available the individual declarations of conformity for all non-benign ancillaries covered by the LV and EMC Directives.

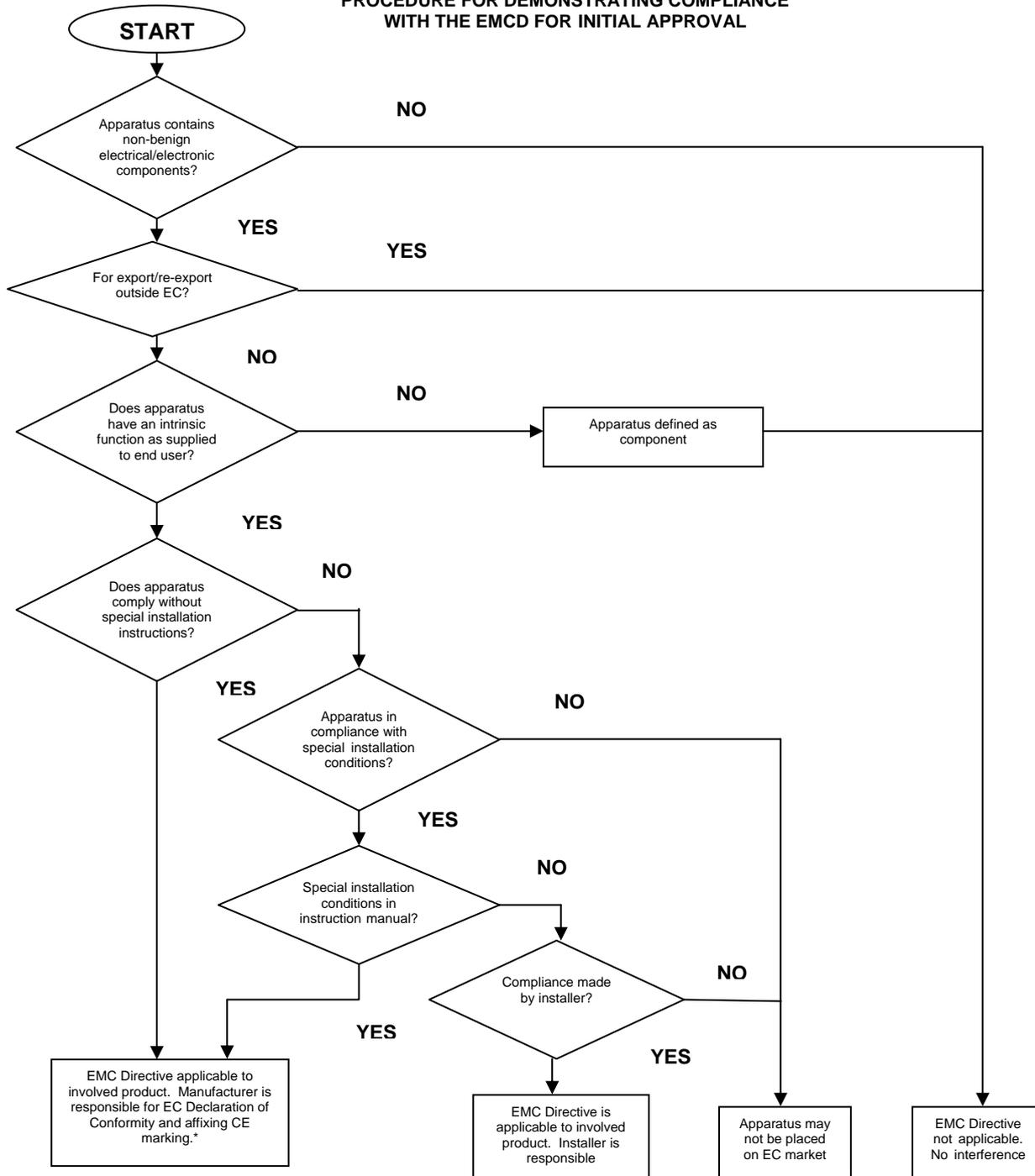
6. Language

6.1 The LV Directive makes reference only to the equipment "operating instructions" being printed in the language of the end user. Declaration of conformity or incorporation need only be in the language of the manufacturer.

6.2 *BVAA Recommendation*

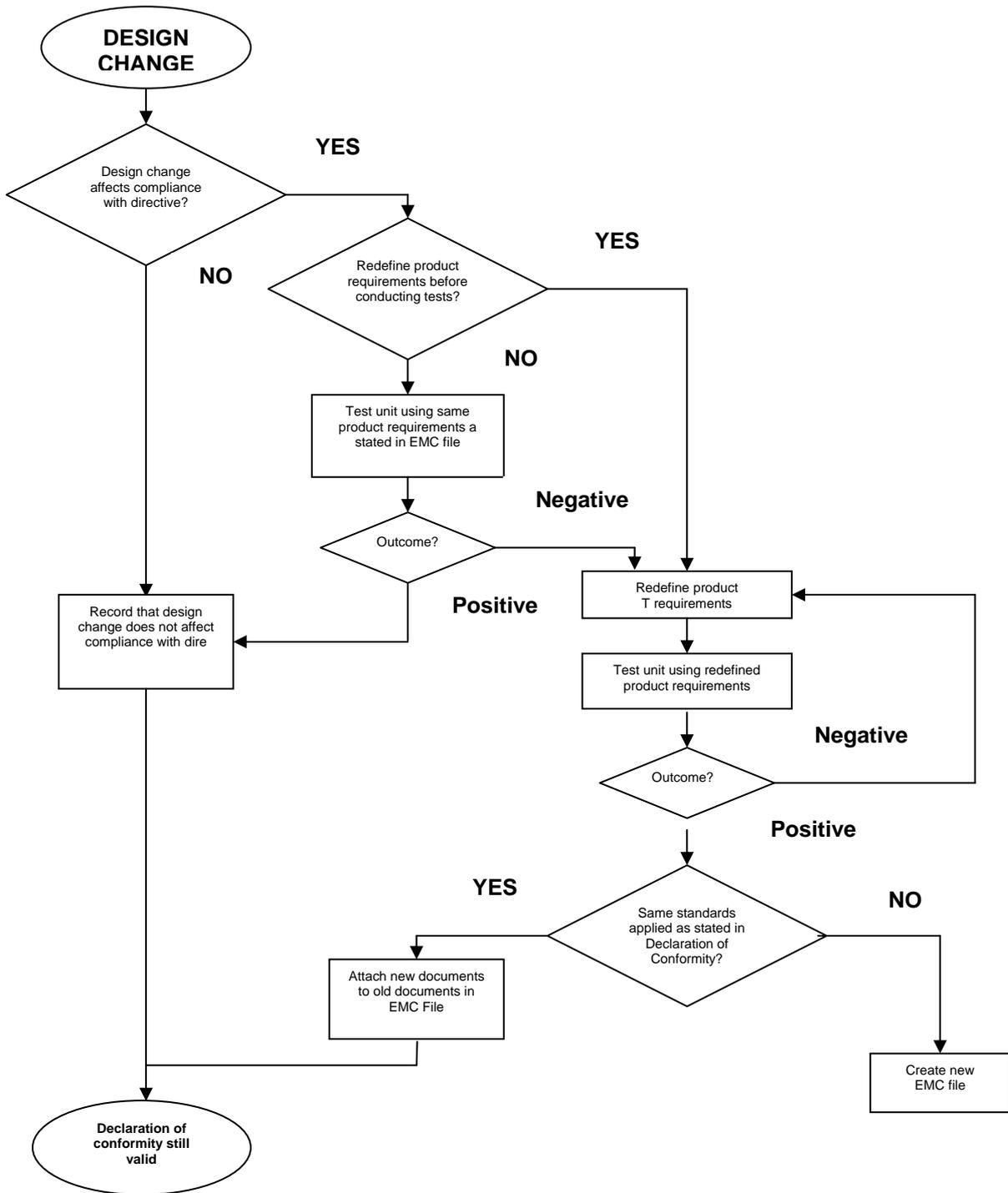
Operating instructions should be printed in the language of the equipment end user. Members may also consider it good exporting practice to print any maintenance manuals in the language of the end user.

PROCEDURE FOR DEMONSTRATING COMPLIANCE WITH THE EMCD FOR INITIAL APPROVAL



*Other directives must also be considered

PROCEDURE FOR DEMONSTRATING COMPLIANCE WITH THE EMC DIRECTIVE FOR CHANGES IN DESIGN



DETAILS OF CE CONFORMITY MARKING

The Official Journal of the European Communities No. L220/7 dated 30/8/93 gives the following information CE conformity marking:

- The CE conformity marking shall consist of the initials “CE” taking the following form:



- If the CE marking is reduced or enlarged the proportions given in the above graduated drawing must be respected.
- Where the apparatus is the subject of other Directives covering other aspects and which also provide for the CE conformity marking, the latter shall indicate that the appliances are also presumed to conform to those other Directives.
- However, where one or more of these Directives allow the manufacturer, during a transitional period, to choose which arrangements to apply, the CE marking shall indicate conformity only to the Directives applied by the manufacturer. In this case, particulars of the Directives applied, as published in the *Official Journal of the European Communities*, must be given in the documents, notices or instructions required by the Directives and accompanying such apparatus.
- The various components of the CE marking must have substantially the same vertical dimension, which may not be less than 5mm.

TYPICAL EXAMPLE OF AN EC DECLARATION OF CONFORMITY

DECLARATION OF CONFORMITY

We,

Company name & address.....
.....
.....
.....

declare under our sole responsibility that the following range(s) of: (list products, eg Actuators) and associated products

- eg ABC Range
- Hydraulic Range
- Compact Range
- ¼ turn Range
- etc

and their derivatives conform to the essential protection requirements of the LV (Low Voltage) Directive 73/23/EEC amended by 93/68/EEC by the application of (state appropriate EN standard e.g EN60241 – 1 1993).

(Company name).....also declares that the above products and their derivatives conform to the requirements of the EMC (Electro Magnetic Compatibility) Directive 89/336/EEC amended by 92/31/EEC by the application of (state appropriate EN standard, eg EN50081 – 2 and 5008-2).

Issued in (name town).....on (date).....

Signed for and on behalf of (state Company name).....

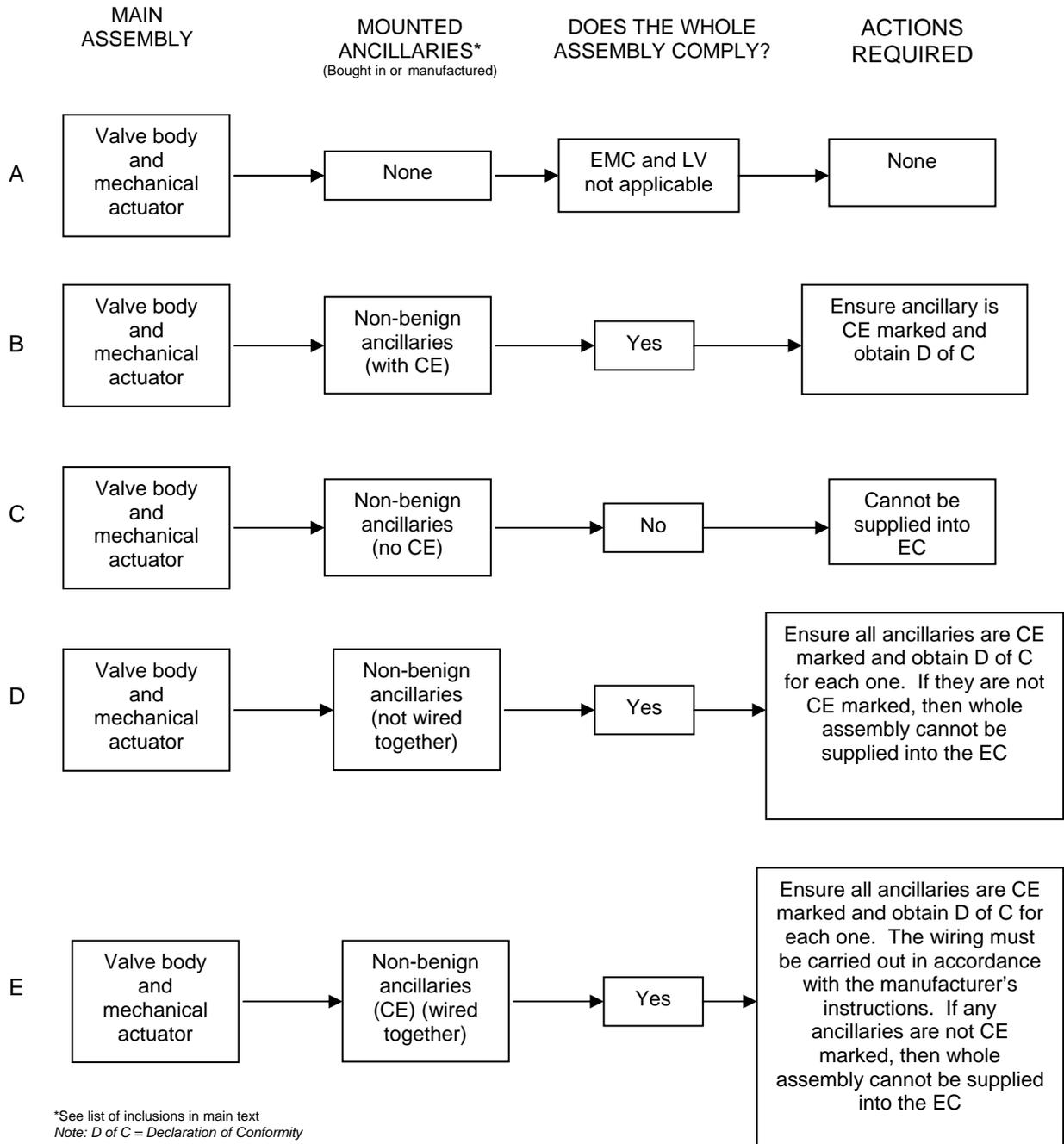
Signed.....

(Name).....

Position.....

Examples of configurations of valves/mechanical actuators with or without electrical apparatus/equipment

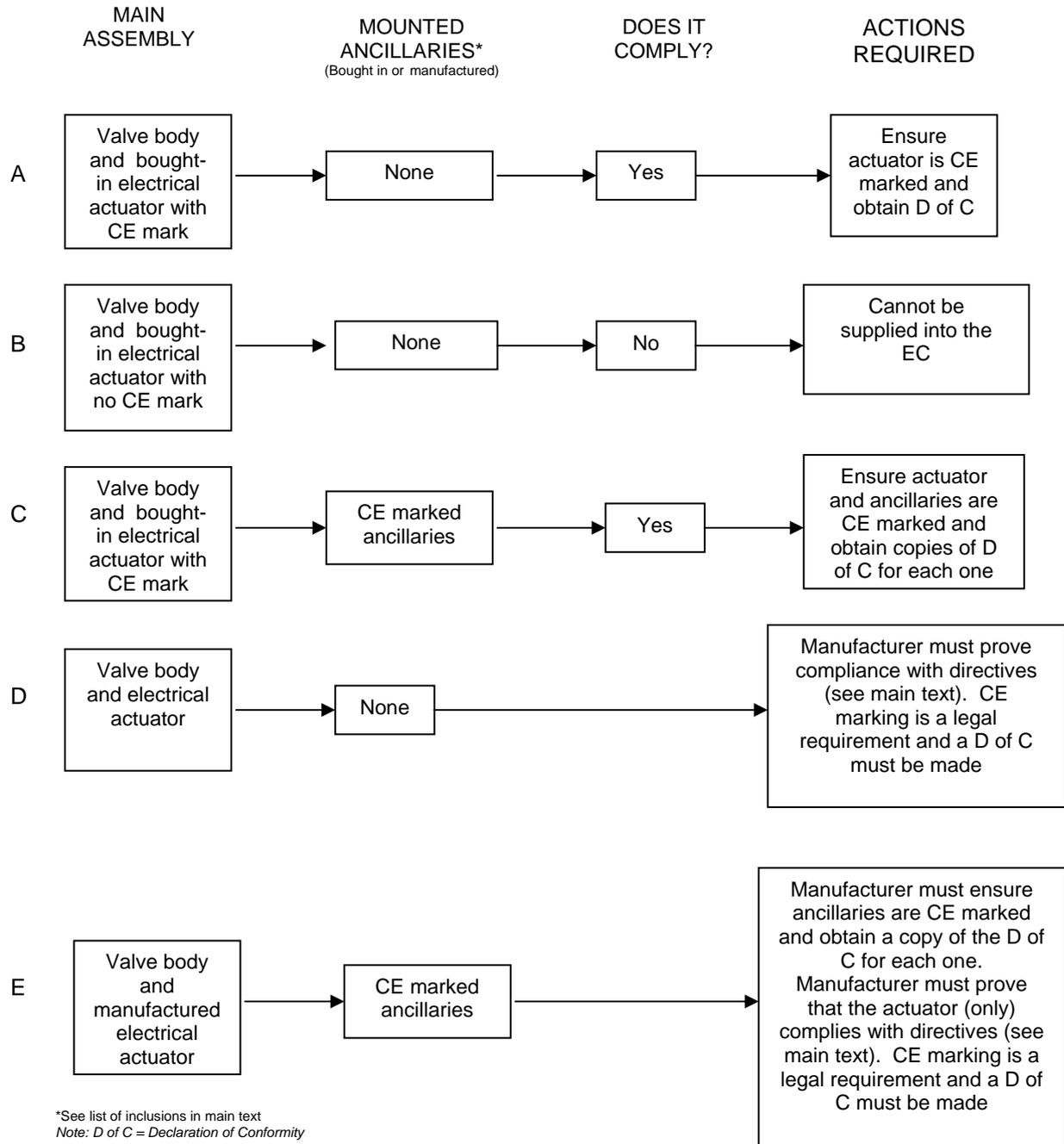
MECHANICAL ACTUATION



*See list of inclusions in main text
 Note: D of C = Declaration of Conformity

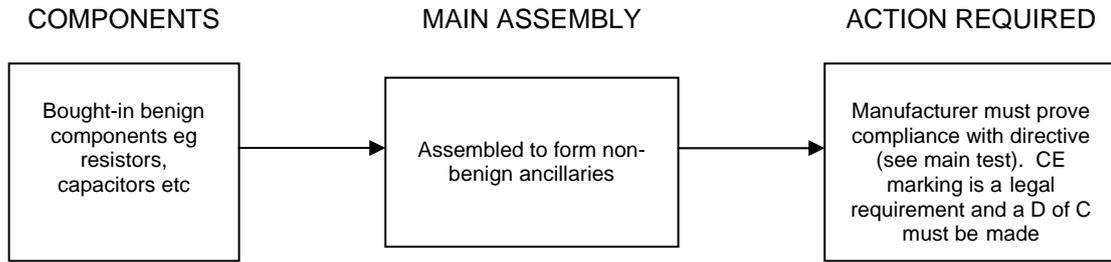
Examples of configurations of valves/mechanical actuators with or without electrical apparatus/equipment

ELECTRICAL ACTUATION

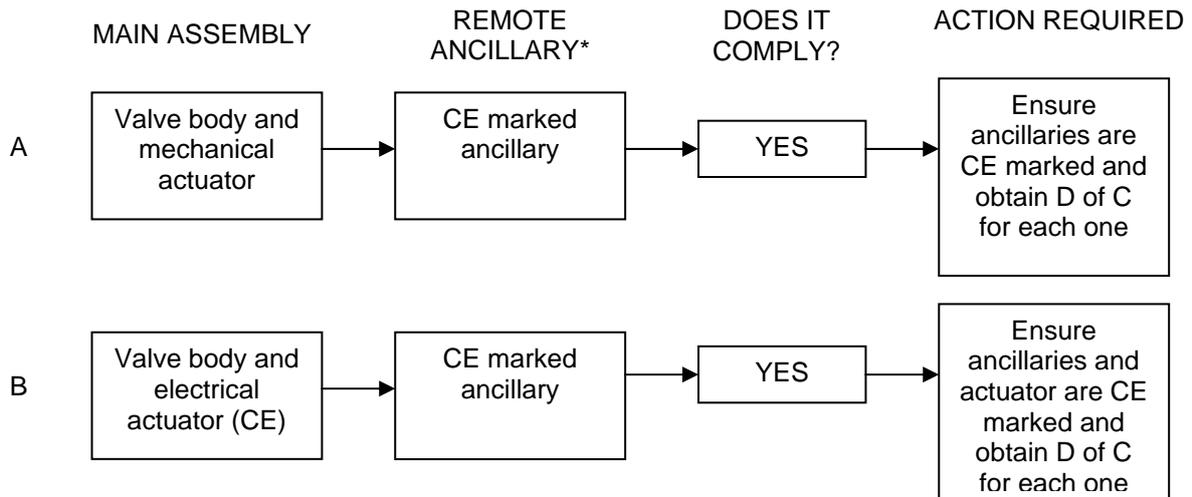
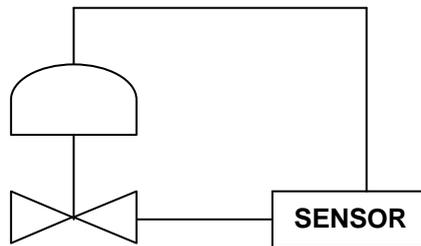


Examples of configurations of valves/actuators with electrical apparatus/remote ancillaries

ELECTRICAL APPARATUS
(E.G. Positioner)



VALVE AND ACTUATOR WITH REMOTE ANCILLARIES



* See list of inclusions in main text
Note: D of C = Declaration of Conformity

BIBLIOGRAPHY

1. EC Directive Electromagnetic Compatibility (EMC) 89/336/EEC
2. EMC Amending Directive 92/31/EEC
3. EC Directive Low Voltage 72/23/EEC
4. EC Directive CE Marking 93/68/EEC
5. The Electromagnetic Compatibility Regulations SI/1992/2372
6. The Electromagnetic (Amendment) Regulations SI/1994/3080
7. The Electrical Equipment Safety Regulations 1994

Availability of Directives and Regulations – these can be obtained directly from HMSO without the need to quote ISBN numbers.

Contact numbers are:

Tel: 0207 873 8296

Fax: 0207873 8200

8. DTI Guidance Notes on the UK EMC Regulations May 1995
9. DTI Guidance Notes on the Low Voltage Directives

Availability of DTI Guidance Notes – these can be obtained through DTI's Business in Europe Hotline on 0117 944 4888

Availability of Texts of Harmonised Standards – these can be obtained from BSI Sales, 389 Chiswick High Road, London W4 4AL – Tel: 0208 996 7000

UKAS (United Kingdom Accreditation Service) – a directory of accredited laboratories – can be obtained by telephoning 0208 943 7135

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