

This is a preview of "ISO 10094-2:2021". [Click here to purchase the full version from the ANSI store.](#)

Second edition
2021-11

Pneumatic fluid power — Electro- pneumatic pressure control valves —

Part 2:

Test methods to determine main characteristics to include in the supplier's literature

*Transmissions pneumatiques — Appareils électropneumatiques de
distribution à commande continue de pression —*

*Partie 2: Méthodes d'essai pour déterminer les principales
caractéristiques à inclure dans la documentation des fournisseurs*



Reference number
ISO 10094-2:2021(E)

© ISO 2021



COPYRIGHT PROTECTED DOCUMENT

© ISO 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

This is a preview of "ISO 10094-2:2021". Click here to purchase the full version from the ANSI store.

Contents

	Page
Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Symbols and units	2
5 Test conditions	3
5.1 Gas supply.....	3
5.2 Temperature.....	3
5.3 Pressures.....	3
5.3.1 General.....	3
5.3.2 Inlet pressure.....	3
5.3.3 Test pressures.....	3
5.3.4 Checking.....	3
5.4 Electrical supplies.....	3
6 Test procedures	4
6.1 Test conditions.....	4
6.2 Inlet pressure.....	4
6.3 Static tests.....	4
7 Control signal/pressure static-characteristics test at null forward or relief flow rate	4
7.1 Test installation.....	4
7.1.1 Test circuit.....	4
7.1.2 Pressure measurement.....	5
7.2 Test procedures.....	5
7.2.1 Control signal/pressure static characteristic test.....	5
7.2.2 Minimum regulated pressure test.....	5
7.2.3 Resolution test.....	6
7.2.4 Repeatability test.....	6
7.3 Calculation of characteristics.....	7
7.3.1 Characteristic curve.....	7
7.3.2 Linearity.....	8
7.3.3 Control signal/pressure hysteresis.....	9
7.3.4 Minimum regulated pressure.....	10
7.3.5 Resolution.....	11
7.3.6 Repeatability.....	11
7.3.7 Sensitivity.....	12
7.3.8 Offset.....	12
8 Flow/pressure static characteristics test	12
8.1 Test circuit for flow rate measurement.....	12
8.2 General requirements.....	13
8.3 Test procedures.....	14
8.3.1 Initial test procedure.....	14
8.3.2 Forward flow rate/pressure characteristics test.....	14
8.3.3 Relief flow rate/pressure characteristics test.....	14
8.3.4 Procedure for other control signal values.....	15
8.4 Calculation of characteristics.....	15
8.4.1 Characteristic curves.....	15
8.4.2 Flow rate/pressure hysteresis.....	15
8.4.3 Maximum forward sonic conductance.....	15
8.4.4 Maximum relief sonic conductance.....	16
9 Pressure regulation characteristics test	17

This is a preview of "ISO 10094-2:2021". [Click here to purchase the full version from the ANSI store.](#)

9.1	Test circuit.....	17
9.2	Test procedure.....	17
10	Leakage at null forward flow rate or relief flow rate characteristic test.....	17
10.1	Test circuit.....	17
10.2	Test procedure.....	18
10.3	Calculation of characteristic.....	18
11	Dynamic characteristics – Step responses.....	18
11.1	Test Installation.....	18
11.2	Test procedures.....	19
11.3	Calculation of characteristics.....	20
	11.3.1 Charge characteristic curves.....	20
	11.3.2 Discharge characteristic curves.....	20
	11.3.3 Charge characteristics.....	20
	11.3.4 Discharge characteristics.....	21
12	Presentation of test results.....	22
12.1	General.....	22
12.2	Control signal/pressure static characteristics.....	22
12.3	Flow rate/pressure characteristics.....	23
12.4	Pressure regulation characteristics.....	23
12.5	Leakage characteristic.....	23
12.6	Dynamic characteristics.....	23
Annex A (informative) Frequency responses.....		24
Annex B (informative) Calculation procedures of gain and phase lag.....		26
Bibliography.....		30

This is a preview of "ISO 10094-2:2021". Click here to purchase the full version from the ANSI store.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 131, *Fluid power systems*, Subcommittee SC 5, *Control products and components*.

This second edition cancels and replaces the first edition (ISO 10094-2:2010), which has been technically revised.

The main changes are as follows:

- Addition of definitions for response time, settling time, and shifting time in [Clause 3](#);
- Revision of the procedure for the repeatability test: addition of 15 % and 85 % of the electrical control signal full-scale to tested values (in addition to 50 %) in [7.2.4](#);
- Addition of two subclauses relating to Sensitivity ([7.3.7](#)) and Offset ([7.3.8](#)) respectively;
- Revision of the test procedure to determine leakage characteristics to simplify the test practice ([10.2](#)).
- Deletion of the no tank test version and test circuit from the test practices in [Clause 11](#) related to dynamic characteristics;
- The former [subclause 11.2](#), frequency characteristics, has been made an informative annex ([Annex A](#)).

A list of all parts in the ISO 10094 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

In pneumatic fluid power systems, power is transmitted and controlled through a gas under pressure within a circuit.

When pressure tracking or pressure regulation is required, electro-pneumatic continuous pressure control valves can be used to track a variable set point with low tracking error or to maintain the pressure of the gas at an approximately constant level.

These control valves continuously modulate the pneumatic pressure of a system in response to a continuous electrical input signal and link the electrical input value to a proportional pressure value.

It is therefore necessary to know some performance characteristics of these electro-pneumatic continuous pressure control valves in order to determine their suitability.