# ISO 10770-3:2020-04 (E)

## Hydraulic fluid power - Electrically modula ted hydraulic control valves - Part 3: Test methods for pressure control valves

## Contents

Page


Foreword ..... v

Introduction ..... vi

1 Scope ..... 1

2 Normative references ..... 1

3 Terms, definitions and symbols ..... 1
3.1 Terms and definitions ..... 1
3.2 Symbols ..... 2

4 Standard test conditions ..... 3

5 Test installation ..... 3

6 Accuracy ..... 6
6.1 Instrument accuracy ..... 6
6.2 Dynamic range ..... 7

7 Electrical tests for valves without integrated electronics ..... 7
7.1 General ..... 7
7.2 Coil resistance ..... 7
7.2.1 Coil resistance (cold) ..... 7
7.2.2 Coil resistance (hot) ..... 7
7.3 Coil inductance (optional test) ..... 7

8 Relief valve ..... 9
8.1 Steady-state tests ..... 9
8.1.1 General ..... 9
8.1.2 Proof pressure tests (optional) ..... 9
8.1.3 Internal leakage test ..... 10
8.1.4 Test to establish the valve-controlled pressure versus input signal characteristic with constant flow ..... 11
8.1.5 Threshold test ..... 12
8.1.6 Pressure versus flow with constant input signal ..... 13
8.1.7 Pressure versus fluid temperature ..... 15
8.2 Dynamic tests ..... 16
8.2.1 General ..... 16
8.2.2 Test circuit ..... 16
8.2.3 Step response (change in input signal) ..... 17
8.2.4 Step response (change in flow) ..... 19
8.2.5 Frequency response ..... 21

9 Reducing valve ..... 22
9.1 Steady-state tests ..... 22
9.1.1 General ..... 22
9.1.2 Proof pressure test (optional) ..... 23
9.1.3 Pilot flow test ..... 23
9.1.4 Test to establish the valve-controlled pressure versus input signal characteristics with constant flow ..... 24

9.1.5 Threshold ..... 25
9.1.6 Valve pressure versus flow characteristic with constant input signal ..... 26
9.1.7 Controlled pressure versus fluid temperature ..... 29
9.2 Dynamic tests ..... 29
9.2.1 General ..... 29
9.2.2 Test circuit ..... 30
9.2.3 Step response (change in input signal) ..... 30
9.2.4 Step response (change in flow) ..... 30
9.2.5 Frequency response ..... 33

10 Pressure impulse test ..... 33

11 Presentation of results ..... 34
11.1 General ..... 34
11.2 Test reports ..... 34
11.2.1 General ..... 34
11.2.2 Test reports for production acceptance tests ..... 34
11.2.3 Test reports for type test ..... 35

12 Identification statement ..... 35

Annex A (informative) Testing guidance ..... 36

Bibliography ..... 37