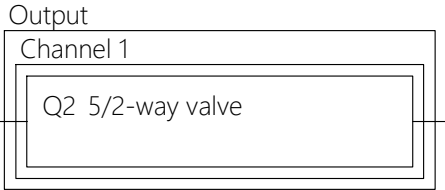


Safety subfunctions and Block diagrams

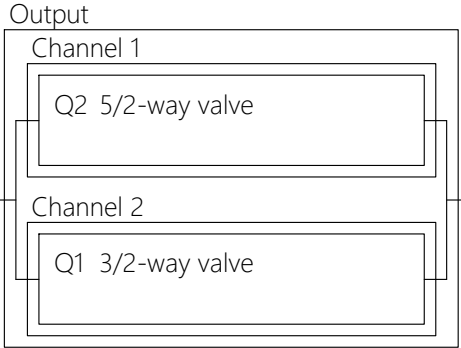
Switch-off working valve

PUS - Prevention unexpected start-up: up to category 1, up to PL c can be reached



Switch-off working pressure and working valve

PUS - Prevention unexpected start-up: up to category 3, up to PL e can be reached

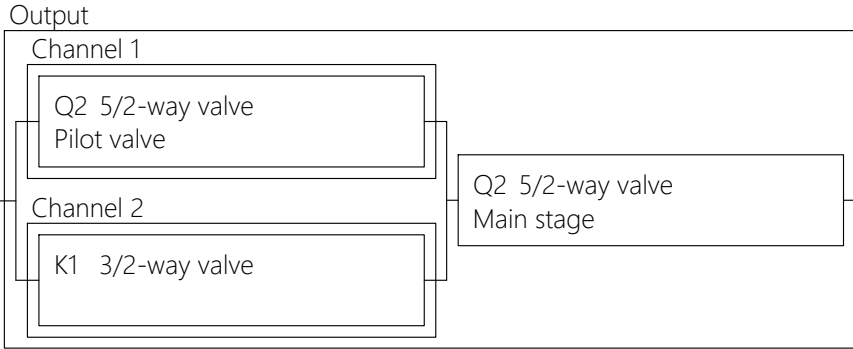


Q2, B3, B4  
5/2-way valve  
Diagnostic coverage DC=90%  
Indirect monitoring  
With positioning time monitoring by limit switches  
(estimate according ISO 13849-1, table E.1)

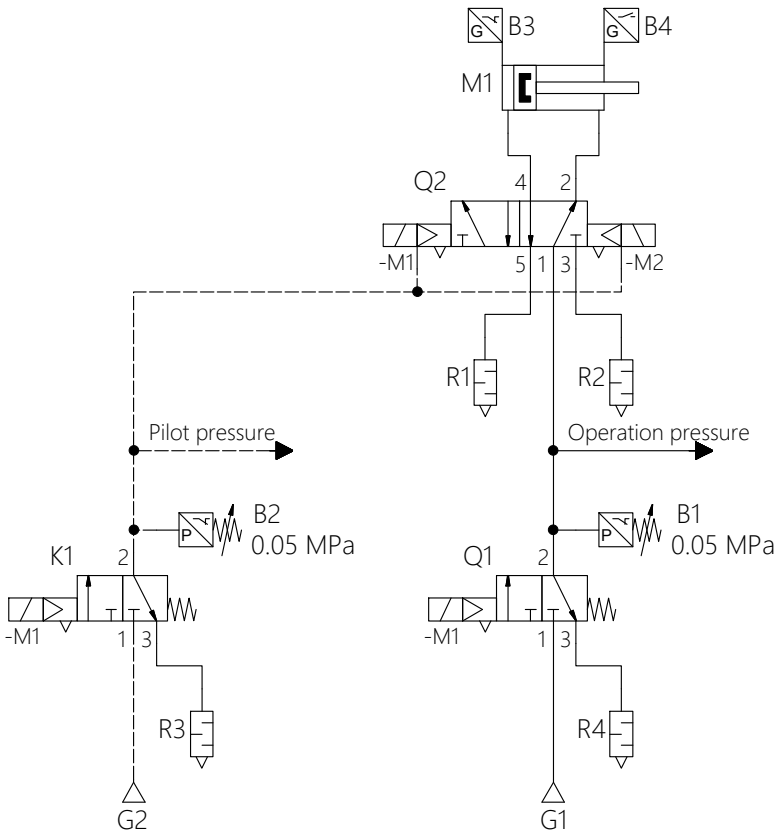
Q1, B1  
3/2-way valve  
Diagnostic coverage DC=90%  
Indirect monitoring  
With switching time monitoring by pressure switch  
(estimate according ISO 13849-1, table E.1)

Switch-off pilot pressure and working valve

PUS - Prevention unexpected start-up: up to category 3, up to PL d can be reached



Q2, B3, B4  
5/2-way valve  
Diagnostic coverage DC=90%  
Indirect monitoring  
With positioning time monitoring by limit switches  
(estimate according ISO 13849-1, table E.1)  
Q2  
Valve needs following fault exclusion:  
Spontaneous change of the initial switching position  
(without an input signal) for the main stage  
PL e shall not depend solely on fault exclusion  
(ISO 13849-1, 6.1.10.3), so the maximum  
possible PL is limited to PL d.  
K1, B2  
3/2-way valve  
Diagnostic coverage DC=90%  
Indirect monitoring  
With switching time monitoring by pressure switch  
(estimate according ISO 13849-1, table E.1)



Parts list

| Pos.... | Identifi... | Description         |
|---------|-------------|---------------------|
| 1       | B1          | Pressure switch     |
| 2       | B2          | Pressure switch     |
| 3       | B3          | Limit switch        |
| 4       | B4          | Limit switch        |
| 5       | G1          | Operation pressure  |
| 6       | G2          | Pilot air           |
| 7       | K1          | 3/2-way valve       |
| 8       | M1          | Double-acting drive |
| 9       | Q1          | 3/2-way valve       |
| 10      | Q2          | 5/2-way valve       |
| 11      | R1          | Silencer            |
| 12      | R2          | Silencer            |
| 13      | R3          | Silencer            |
| 14      | R4          | Silencer            |

Q1  
In the event of certain failures, the shut-off of valve Q1 is used as a failure reaction. Failures are e.g. control of a movement by entry of compressed air via the exhaust of the pilot valve or the drive does not reach the end position.  
By switching off Q1 in the event of a failure, a safe state can be reached, if a possible movement out of an end position does not lead to any hazard.  
Other measures may also be suitable.  
This has to be assessed in relation to the application.