
# **PLUTO** Safety-PLC

## Operating instructions

## Hardware

**Safety parameters**

| | |
|---|---|
| SIL according to IEC 61508 | SIL 3 |
| SIL according to EN 62061 | SIL CL 3 |
| PL according to EN ISO 13849-1 | PL e |
| Category according to EN ISO 13849-1 | 4 |
| $DC_{avg}$ according to EN ISO 13849-1 | High |
| CCF according to EN ISO 13849-1 | Meets the requirements |
| HFT (Hardware fault tolerance) | 1 |
| SFF (Safe failure fraction) | >99% for the single channel parts<br>>90% for the double channel parts |

| Digital input to Safety output * | |
|---|---|
| $PFD_{AV}$ (for proof test interval = 20 years) | $1.5 \times 10^{-4}$ |
| $PFH_D$ according to IEC 61508/EN 62061 | $2 \times 10^{-9}$ |
| $MTTF_d$ according to EN ISO 13849-1 | High/1100 years |

| Analogue inputs to Safety output (Pluto D20, D45) | 2 inputs/sensors (see 4.3.2) | 1 input/sensor (see 4.3.2) |
|---|---|---|
| SIL according to IEC 61508/EN 62061 | Up to SIL 3 | Up to SIL 2 |
| PL according to EN ISO 13849-1 | Up to PL e | Up to PL d |
| $DC_{avg}$ according to EN ISO 13849-1 | Up to High | Up to Medium |
| $PFD_{AV}$ (for proof test interval = 20 years) | $1.5 \times 10^{-4}$ | $1.5 \times 10^{-3}$ |
| $PFH_D$ according to IEC 61508/EN 62061 | $1.6 \times 10^{-9}$ | $5.8 \times 10^{-9}$ |
| $MTTF_d$ according to EN ISO 13849-1 | High/1100 years | High/400 years |

| Counter inputs to Safety output (Pluto D45) | 2 inputs/sensors (see 4.4.7) | 1 input/sensor (see 4.4.7) |
|---|---|---|
| SIL according to IEC 61508/EN 62061 | Up to SIL 3 | Up to SIL 1 |
| PL according to EN ISO 13849-1 | Up to PL e | Up to PL c |
| $DC_{avg}$ according to EN ISO 13849-1 | Up to High | Up to High |
| $PFD_{AV}$ (for proof test interval = 20 years) | $1.5 \times 10^{-4}$ | $1.5 \times 10^{-4}$ |
| $PFH_D$ according to IEC 61508/EN 62061 | $1.6 \times 10^{-9}$ | $1.6 \times 10^{-9}$ |
| $MTTF_d$ according to EN ISO 13849-1 | High/1100 years | High/1100 years |

Note:
$PFD_{AV}$ = Average probability of dangerous failure on demand
$PFH_D$ = Probability of dangerous failure per hour
$MTTF_d$ = Mean time to dangerous failure/channel
PL = Performance level (as defined in EN ISO 13849-1)
CCF = Common cause failure
*Input to output (incl. AS-i and CAN bus)