

**From SG-EFS 1X4 ZK2/1 8k2  
to SG-EFS 104/2W**

**A simple swap!**



Type	SG-EFS 1X4 ZK2/1 8k2	SG-EFS 104/2W
<b>Safety classifications</b> ISO 13856: Reset function ISO 13849-1:2015 only control unit as a pressure-sensitive protection device ISO 13856 MTTF <sub>D</sub> DC <sub>avg</sub> B <sub>10D</sub> [ × 10 <sup>6</sup> ]	with/without  Category 3 PL e Category 3 PL d 313 years 90% 2	with/without  Category 3 PL d Category 3 PL d 256 years 60% 1.8
<b>Times</b> Reaction time Re-start time	< 10 ms < 190 ms	< 15 ms < 50 ms
<b>Control unit Inputs</b> Types of sensors Monitoring type Monitoring circuits	SM, SP, SL, MSL, SB Resistor 8k2 1	SM, SP, SL, MSL, SB Resistor 8k2 1
<b>Control unit Outputs</b> Switching channels Switching current (min. / max.) Switching capacity (max.) additional outputs	1× 2-channel 10 mA / 2 A 500 VA / 48 W 1 Signal circuit	1× 2-channel – / 4 A 1000 VA / 96 W 1 Signal circuit
<b>Mechanical operating conditions</b> Attachment IEC 60529: Degree of protection Operating temperature Dimensions (W × H × D)	Mounting rail IEC 60715 IP20 -20 to +50 °C 45 × 75 × 105 mm	Mounting rail IEC 60715 IP20 -25 to +55 °C 22.5 × 99 × 114.5 mm
<b>Variants</b> Part number Connecting voltage U <sub>s</sub>	<b>SG-EFS 104 ZK2/1 8k2</b> 1003100 AC/DC 24 V  <b>SG-EFS 134 ZK2/1 8k2</b> 7500354 AC 230 V	<b>SG-EFS 104/2W</b> 1005196 AC/DC 24 V  A power supply unit must be connected upstream with a connecting <b>AC 230 V</b> . Mayer recommends a top-hat rail power supply with an output voltage of 24 V and output power of min. 5 W (e.g. Mean Well HDR-15-24).
<b>Connections</b> Supply voltage Sensor Switching channel 1 Switching channel 2 Signal circuit Signal output Sensor Signal output Fault Reset manual Reset automatic	A1, A2 Y1, Y2 13, 14 23, 24 31, 32 – – 5, 6 7, 8	A1, A2 Y1, <b>Y3</b> 13, 14 23, 24 <b>41, 42</b> AC: M1, S1 DC: M1, A2 AC: M2, S1 DC: M2, A2 <b>S1, S3</b> <b>S1, S2</b>

## LED indicators

Until now		Meaning	Now			
SG-EFS 1X4 ZK2/1 8k2			SG-EFS 104/2W			
K1	K2	LED off: ○ LED on: ●	Power	Sensor	Output	Fault
○	○	No supply voltage	○	○	○	○
●	●	Control unit ready for operation	●	●	●	○
○	○	Sensor activated	●	○	○	○
○	○	Fault at sensor	●	○	○	●

## Successful change: the last few steps

### Take reaction time into consideration

$T$  = Follow-through time of the complete system

$t_1$  = Response time safety edge

$t_2$  = Stopping time of the machine

$t_{SX}$  = Response time of the sensor SX

$t_{SG}$  = Reaction time of the control unit SG

The slightly longer reaction time of the SG-EFS 104/2W is put into perspective if the follow-through time of the whole system is taken into consideration:

$$T = t_1 + t_2$$

where  $t_1 = t_{SX} + t_{SG}$

$$T = t_{SX} + t_{SG} + t_2$$

The reaction time of the control unit only makes up a small proportion of the follow-through time. However, the safety function should always be reviewed and – if critical – be calculated again.

### An identical performance level

When determining the performance levels for a pressure-sensitive protection device according to ISO 13856, the values  $DC_{avg}$  and  $MTTF_D$  now play an important role. The connected sensors in contrast must no longer be taken into consideration due to the fault exclusions according to ISO 13849-2 Table D.8.

Only the values of the control unit still apply. On the basis of a presumed high  $MTTF_D$  value of the control unit, such a pressure-sensitive protection device can only reach a maximum of PL d.

Until now	ISO 13849-1	Now
SG-EFS 1X4 ZK2/1 8k2		SG-EFS 104/2W
3	Category	3
medium	$DC_{avg}$	low
high	$MTTF_D$	high
d	achieved PL	d

The change to an equivalent pressure-sensitive protective device now just needs to be documented in your safety assessment under the relevant protective function. Finished!