Product overview

AFS/AFM60S Pro

Safety encoder for safe positioning, optionally programmable

SICK
Sensor Intelligence.

Advantages

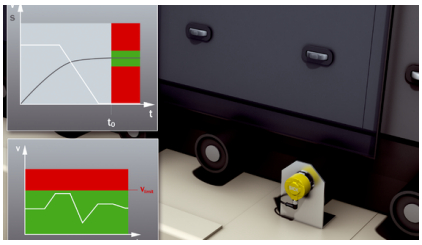
Certified safety product

The AFS/AFM60S Pro safety encoder stands for functional safety and fulfills very high safety requirements. The encoder is certified for applications up to SIL 3 / PL 3 and supports safety functions that conform to IEC 61800-5-2. The AFS/AFM60S Pro therefore guarantees safe positioning in stationary and mobile applications.

One thing is clear: The AFS/AFM60S Pro is safe.

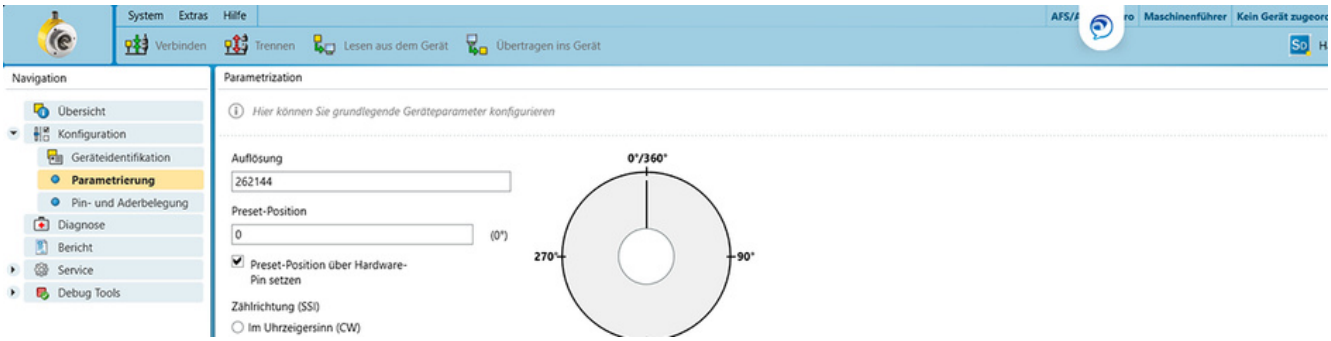
Certified for applications up to SIL 3 (IEC 61508, IEC 61800-5-3) and PL e (EN ISO 13849)

Simple safety engineering and simple encoder installation at consistently high machine and system availability



Supports the safety functions of drives in accordance with IEC 61800-5-2

Simplify the certification process for your system: The AFS/AFM60S Pro has already been certified by an external testing body and can be integrated quickly into your system.



Programmable and flexible

The AFS/AFM60S Pro allows for flexible integration into various controls with its SSI and Sin/Cos interface. It therefore has the decisive advantage of individualized adjustment of different parameters, e.g. encoder resolution and counting direction. Different mechanical variants and types of connector also increase the flexibility of the encoder.

Designed for different applications

Flexible implementation and adaptation options for new applications

The integrated error memory saves important ambient data and ensures high transparency of ambient and encoder functions

The compact design opens up flexible installation options – even with limited installation space

Stay flexible: The programmable AFS/AFM60S Pro offers different configuration and connection options and a wide range of uses.

Extreme mechanical reliability

The AFS/AFM60S Pro not only stands out due to its high safety integrity level. Its mechanical load capability and reliability also set standards, which has been verified by a successful examination using the latest test principles of the Institute for Occupational Safety and Health of the German Social Accident Insurance Association (IFA). The safety encoder therefore stands for very high quality and precision in every detail.

Tested in accordance with the latest test principles

Meets the latest requirements on the safety of encoders (SR) in accordance with IEC 61800-5-3; verified by the Institute for Occupational Safety and Health of the German Social Accident Insurance (IFA)

Reliable fault exclusion thanks to safety clamping ring with positive and non-positive connections

Mechanical reliability – solid shaft with flat or with feather key groove

You can count on it: The AFS/AFM60S Pro stands for certified electrical and mechanical safety.

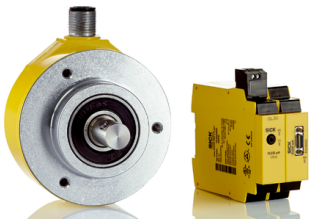
Complete package is easy to integrate

The AFS/AFM60S Pro can be implemented into systems quickly, easily and inexpensively. It makes it possible to realize safety functions for stationary and mobile safety applications in no time, especially in combination with other safety products from SICK. Thanks to the plug and play principle of the encoder, this is all very simple and offers the advantage of aligned safety products, for example for the implementation of complete solutions in the field of Safe Motion Control.

A complete safety solution from a single source

SICK stands for many years of experience in safety and drive technology and world-wide service

Complete Safe Motion Control solutions from SICK



Perfectly aligned: The AFS/AFM60S Pro combined with the Drive Monitor FX3-MOC motion control module

Save time and money with the simple plug and play implementation of the AFS/AFM60S Pro and the complete solutions from SICK.

Safety encoders such as the AFS/AFM60S Pro play an important role when integrating innovative safety concepts for safe movement monitoring of machines and systems. For instance, the encoder is ideally aligned to the Flexi Soft safety controller, and the two devices create a powerful safety solution when used together: Safe Motion Control from SICK. It enables a very high level of safety and increases the efficiency of machines and systems at the same time.

How does Safe Motion Control achieve this combination of safety and efficiency? Precise differentiation of dangerous and safe machine movements at all times: The Flexi Soft safety controller monitors sensor signals and makes it possible to assess a dangerous state. If no hazard exists, the operator is permitted to intervene in the machine operation even during the running process – the process is not interrupted. Unnecessary machine stops and downtime are reduced in this way, increasing productivity.

Creating safe productivity – without interruptions

Safe Motion Control – safe productivity for stationary and mobile applications

Safe Motion Control offers a very high level of personal safety and at the same time ensures consistent performance of machines and systems. Safe Motion Control is therefore an innovative and powerful solution - for stationary and mobile applications alike. The operator can insert material into the machine by monitoring and reducing the speed of, for example, a metal press. It it no longer necessary to completely shut off the machine. Thanks to Safe Motion Control, automated guided vehicle systems (AGV systems) adjust their speed when persons are registered in the hazardous area of the system, thereby enabling effective use of the available space.

Productivity for a safe future

Safe Motion Control proves that the safety of machines, systems and persons does not automatically mean machine or system downtime. Thanks to Safe Motion Control, production or logistics processes can be monitored and controlled safety and permanently. The perfect combination, the certified AFS/AFM60S Pro safety encoder and the Drive Monitor FX3-MOC motion control module, ensures complete protection of machine or systems as well as the safety of persons. And all this with consistent machine and system availability and productive operation without interruption. Creating safe productivity. Now.

Technical data overview

Safety integrity level	SIL 3 (IEC 61508, IEC 61800-5-3) [1]
Performance level	PL e (EN ISO 13849-1) [1]
Category	3 (EN ISO 13849-1) 4 (EN ISO 13849-1)
Encoder design	Multiturn / Singleturn (depends on variant)
Shaft type	Solid shaft, Servo flange Solid shaft, face mount flange Blind hollow shaft Through hollow shaft
Shaft diameter	
Solid shaft, Servo flange	6 mm With flat 6 mm with feather key
Solid shaft, face mount flange	10 mm With flat 10 mm with feather key
Blind hollow shaft	6 mm with feather key groove [2] 8 mm with feather key groove [2] 3/8″ with feather key groove [2] 10 mm with feather key groove [2] 12 mm with feather key groove [2] 1/2″ with feather key groove [2] 14 mm with feather key groove [2] 15 mm with feather key groove [2] 5/8″ with feather key groove [2]
Through hollow shaft	6 mm with feather key groove [2] 8 mm with feather key groove [2] 3/8″ with feather key groove [2] 10 mm with feather key groove [2] 12 mm with feather key groove [2] 1/2″ with feather key groove [2] 14 mm with feather key groove [2] 15 mm with feather key groove [2] 5/8″ with feather key groove [2]
Connection type	Male connector, M23, 12-pin, radial Male connector, M23, 12-pin, axial Male connector, M12, 12-pin, radial Male connector, M12, 12-pin, axial Cable, 12-wire, radial Cable, 12-wire, axial
Communication interface	SSI
Number of steps per revolution (max. resolution)	
SSI, SSI + Sin/Cos, programmable	262,144 (18 bit) [3]
SSI, SSI + Sin/Cos, non programmable	262,144 (18 bit) [3] 1,024 (10 bit) [3] 32,768 (15 bit) [3]

[1] For more detailed information on the exact configuration of your machine/unit, please consult your relevant SICK branch office.

[2] With feather key groove.

[3] Step number per rotation can be parameterized: Singleturn encoder 4 ... 262.144; multiturn encoder 4 ... 262.144 binary (2^2 ... 2^{18}).

[4] At operating temperature measuring point.

	4,096 (12 bit) [3] 26,214 [3]
Max. resolution (number of steps per revolution x number of revolutions)	
SSI, SSI + Sin/Cos, programmable	18 bit x 12 bit (262,144 x 4,096) 15 bit x 12 bit (32,768 x 4,096) 18 bit (262,144) 14 bit x 12 bit (16,384 x 4,096)
SSI, SSI + Sin/Cos, non programmable	18 bit x 12 bit (262,144 x 4,096) 12 bit x 12 bit (4,096 x 4,096) 13 bit x 12 bit (8,192 x 4,096) 4 bit x 12 bit (16 x 4,096)
Operating temperature range	–30 °C ... +95 °C [4] (depends on variant)
Enclosure rating	IP65 (IEC 60529)

[1] For more detailed information on the exact configuration of your machine/unit, please consult your relevant SICK branch office.
[2] With feather key groove.
[3] Step number per rotation can be parameterized: Singleturn encoder 4 ... 262.144; multiturn encoder 4 ... 262.144 binary (2^2 ... 2^{18}).
[4] At operating temperature measuring point.

Product description

The AFS/AFM60S Pro is an absolute encoder for functional safety. It meets the very stringent test criteria according to IEC 61800-5-3 and is a certified safety product up to SIL3/PL e. The absolute encoder supports the safety functions in accordance with IEC 61800-5-2 and impresses in particular with its safe positioning function. Thanks to the high enclosure rating and large temperature range, the AFS/AFM60S Pro can be used in harsh environments. With its SSI and sin/cos interface, it can be easily integrated into a range of different controls. In doing so, singleturn resolution, counting direction and other parameters can be adapted individually. The integrated error memory detects important ambient data which provides support during installation and maintenance.

At a glance

- Certified up to SIL3 (IEC 61508, IEC 61800- 5-3), PL e (EN ISO 13849)
- Single- or multiturn encoder with SSI and sin/cos interface
- Programmable, integrated error memory
- Solid or hollow shaft encoder, mounting with key
- Cable connection, M23 or M12 male connector
- Operating temperature range: –30 °C ... +95 °C

Your benefits

- Certified safety product that ensures the best possible protection for persons, machinery, and systems
- Easy handling of safety functions with complete solutions from SICK: Safe positioning with the AFS/AFM60S Pro and the FX3-MOC1 motion control module of the Flexi Soft safety controller
- Positive and non-positive connections for mechanical reliability
- Safety into the future: Meets the safety requirements on encoders (SR) in accordance with IEC 61800-5-3
- Different configuration and connection options for high levels of flexibility and straightforward implementation
- Suitable for applications with small installation spaces

Fields of application

- Measurement of position, speed and direction of rotation in various industries in which everything depends on safe position and movement monitoring: Mobile automation, mechanical construction, wind energy, storage and conveyors

Type code

Other models and accessories ➜ www.sick.com/AFS_AFM60S_Pro

Solid shaft

Encoder design

S	Singleturn
M	Multiturn

Type

S	Solid shaft

Mechanical design

1	Servo flange M4 thread, solid shaft Ø 6 x 10 mm with flat
D	Servo flange M4 thread, solid shaft Ø 6 x 10 mm with key
F	Servo flange M3 thread, solid shaft Ø 6 x 10 mm with flat
G	Servo flange M3 thread, solid shaft Ø 6 x 10 mm with key
4	Face mount flange M4 thread, solid shaft Ø 10 x 19 mm with flat
E	Face mount flange M4 thread, solid shaft Ø 10 x 19 mm with key
H	Face mount flange M3 thread, solid shaft Ø 10 x 19 mm with flat
J	Face mount flange M3 thread, solid shaft Ø 10 x 19 mm with key

Communication Interface

K	4,5-32 V, SSI + SIN/COS
S	4,5-32 V, SSI + SIN/COS, programmable

Connection type

A	Male connector M23, 12-pin, radial
B	Male connector M23, 12-pin, axial
C	Male connector M12, 12-pin, radial
D	Male connector M12, 12-pin, axial
J	Cable 12-wire, radial 0.5 m
K	Cable 12-wire, radial 1.5 m
L	Cable 12-wire, radial 3 m
M	Cable 12-wire, radial 5 m
N	Cable 12-wire, radial 10 m
I	Cable 12-wire, axial 0.5 m
R	Cable 12-wire, axial 1.5 m
S	Cable 12-wire, axial 3 m
T	Cable 12-wire, axial 5 m
U	Cable 12-wire, axial 10 m

Resolution

4 ... 262,144 [1) 2)]

A	F		6	0	S	-	S									

[1)] Number of steps per revolution, depending on type.

[2)] Number of steps per revolution parameterizable (communication interface "S"): Singleturn encoder 4 ... 262,144; multiturn encoder 4 ... 262,144 binary (2^2 ... 2^{18}). Programmable via programming tool and configuration software "Safety Designer" (www.sick.de). Number of steps per revolution non-programmable devices: see below. Other numbers of steps possible on request.

Hollow shaft

Encoder design

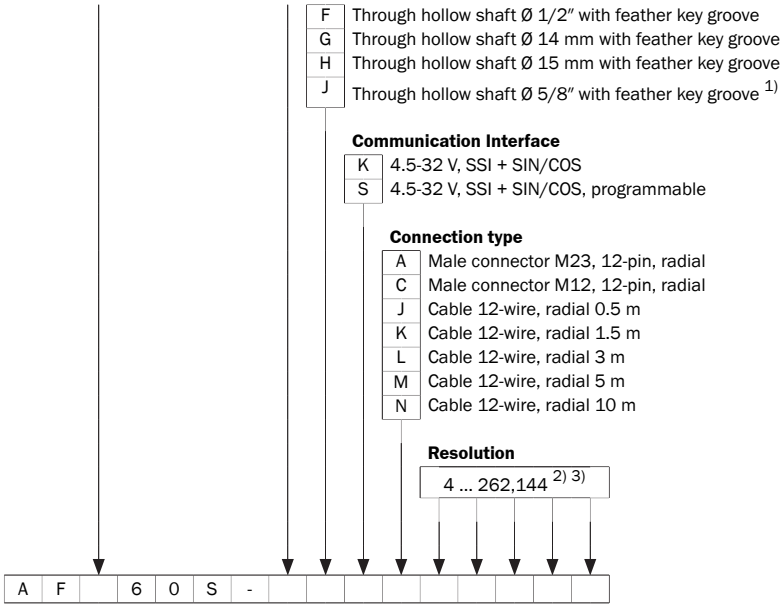
S	Singleturn
M	Multiturn

Type

B	Blind hollow shaft
T	Through hollow shaft

Mechanical design

A	Through hollow shaft Ø 6 mm with feather key groove
B	Through hollow shaft Ø 8 mm with feather key groove
C	Through hollow shaft Ø 3/8″ with feather key groove
D	Through hollow shaft Ø 10 mm with feather key groove
E	Through hollow shaft Ø 12 mm with feather key groove



1) Only for singleturn.

2) Number of steps per revolution, depending on type.

3) Number of steps per revolution parameterizable (communication interface "S"): Singleturn encoder 4 ... 262,144; multiturn encoder 4 ... 262,144 binary (2^2 ... 2^{18}). Programmable via programming tool and configuration software "Safety Designer" (www.sick.de). Number of steps per revolution non-programmable devices: see below. Other numbers of steps possible on request.

SICK AT A GLANCE

SICK is one of the leading manufacturers of intelligent sensors and sensor solutions for industrial applications. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

We have extensive experience in a wide range of industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

Comprehensive services complete our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

For us, that is “Sensor Intelligence.”

WORLDWIDE PRESENCE:

Contacts and other locations –www.sick.com