ENCODERS

Incremental encoders, absolute encoders, safety encoders, linear encoders, wire draw encoders
EtherNet/IP – based on standard TCP and UDP. EtherNet/IP supports the continuity between the office network and the system to be controlled. EtherNet/IP terminals support DHCP in the allocation of IP addresses and device-level ring functionality.

More detailed information about EtherNet can be found at www.odva.org

PROFINET – is the open industrial Ethernet standard for automation. TCP/IP and IP standards are used. PROFINET is realtime Ethernet-capable. Fieldbus systems can be integrated.

More detailed information about PROFINET can be found at www.profinet.com

EtherCAT® – is an Ethernet-based fieldbus that supports network topologies such as line, ring, tree, star and combinations thereof. The open protocol is suitable for realtime requirements in automation technology.

More detailed information about EtherCAT® can be found at www.ethercat.org

SICK Ethernet systems

SICK incremental systems

TTL RS 422 – in a transistor-transistor logic, both the logical status and the amplification are carried out by transistors. That's where the name comes from.

For more information, see the glossary.

HTL Push Pull – High voltage transistor logic functions with an energy supply in the range from 10-30 V DC, with 24 V DC being most common.

“Low” is defined as an output of between 0 VDC ... 3 VDC and “high” as between (Us – 3.5 VDC) ... Us.

Sin/cos interface – unlike conventional pulse signals, sine-cosine signals are emitted in sine-wave form.

These signals can be output at a higher resolution, as there is also an option to sample the signals using an analog-digital converter.

For more information, see the glossary.
Flexible, convenient, and fast  ENCODER PROGRAMMING SOLUTIONS

FOR SPECIFIC ADAPTATION AND EVALUATION OF ENCODERS

SICK offers a variety of solutions for custom adaptation of encoders to user-specific and application-specific circumstances. The programming options range from a compact, light display unit, through PC-based tools, to integration into control units and web-based interfaces. This means that suitable solutions are available for every user and every application – for developers or service staff, for small batch series, spare parts sales, or highly automated systems. The available product range of incremental and absolute encoders and wire draw combinations offers the right product for every application, and can be programmed specifically to your needs.

ENCODER PROGRAMMING FROM A-Z

➔ PGT-10-P
Pocket-sized programming unit for self-contained programming in the workplace or on a building site.

➔ PGT-08-S
PC-based programming unit for convenient programming in the workplace or in production.
Benefits for you

- The encoder properties can be quickly adapted to specific requirements
- Solutions tailored to the target group in question, from service and maintenance to large scale production

- Option to save and clone encoder settings enables fast programming and good traceability
- Cost savings for storage and data management due to reduced variant diversity
- Fast spare parts supply if service is required

→ RS-485
Programming via an RS-485 interface using a PC or user-specific control units.

→ Ethernet via web server
Programming via the web server.

→ Ethernet/Fieldbus
Programming with user-specific control units and engineering software from the manufacturer of the PLC via fieldbus/Ethernet.
ENCODER PROGRAMMING UNIT FOR UNIVERSAL MOBILE USE

The PGT-10-P is a light and compact programming unit for SICK incremental and absolute encoders. Because it has an integrated power supply, it is able to work in a fully self-contained manner and is therefore particularly suitable for mobile use in customer service. Various encoder parameters can be stored on the internal memory or on an SD card. Firmware updates enable the user to add new encoder functions and variants to the PGT-10-P. This means that the programming unit can enjoy a very long service life, offering an optimum price-performance ratio.

**At a glance**
- Programmed incremental and absolute encoders from SICK
- A wide range of menu languages
- Intuitive operation using four buttons
- Large four-line display with background lighting
- Simple cloning of encoder parameters
- Configuration exchange with the PGT-08-S via an SD card
- Optional updates for new encoder variants and functions

**Your benefits**
- Fewer costs as programming means that the customer does not need to store as many encoder variants
- Quick encoder replacement
- Light-weight and compact programming unit for mobile use
- Large display with intuitive controls so that operating staff do not require extra training
- International application and simple operation possible thanks to a range of menu languages
- Cloning function saves time and reduces the risk of errors during programming

**Fields of application**
- Programming the incremental encoders DFS60, DFS20, DFS21, DFS22, DFS25, DFS26 and DFV60 measuring wheel encoder
- Programming the absolute encoders AHS36 SSI, AHM36 SSI, AFS60 SSI, AFM60 SSI
- Ideal for appliance manufacturers, customer service, developers, and distributors
- Ideal for mobile use, particularly in applications with poor access

**Programmable encoder | Description**

<table>
<thead>
<tr>
<th>Programmable encoder</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>➔ DFV60</td>
<td>Measuring wheel encoder, incremental encoder</td>
</tr>
<tr>
<td>➔ DFS60</td>
<td>Incremental encoder</td>
</tr>
<tr>
<td>DFS2x</td>
<td>Incremental encoder</td>
</tr>
<tr>
<td>➔ AFS/AFM60 SSI</td>
<td>Absolute encoder</td>
</tr>
<tr>
<td>➔ AHS/AHM36 SSI</td>
<td>Absolute encoder</td>
</tr>
</tbody>
</table>
THE CONVENIENT AND CLEAR ALL-ROUNDER

The PGT-08-S is a computer-based programming unit for all programmable incremental and SSI absolute encoders and, as a convenient all-rounder, it is also suitable for machine outfits.

At a glance
- Programming unit with SOPAS software for commercially available PCs
- Clear graphical user interface for simple operation
- Programming settings can be saved and loaded
- Can be updated for future products and programming functions by performing a software update
- Modular product concept consisting of programming unit, adapter cables, and software
- Connection to the encoders using encoder-specific adapter cables

Your benefits
- Free driver and software updates via SOPAS
- Graphical user interface clearly displayed on the PC monitor and ergonomic operation using mouse and keyboard
- Programming settings can be saved and loaded to/from the computer memory, which enables fast duplication and traceability
- Encoder position information via the display enables diagnosis without disassembly
- Programming lowers storage costs due to reduced variant diversity

Fields of application
- Ideal for appliance manufacturers, development divisions, small batch series, prototype construction, and distribution

<table>
<thead>
<tr>
<th>Programmable encoder</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>→ DFV60</td>
<td>Measuring wheel encoder, incremental encoder</td>
</tr>
<tr>
<td>→ DFS60</td>
<td>Incremental encoder</td>
</tr>
<tr>
<td>DFS2x</td>
<td>Incremental encoder</td>
</tr>
<tr>
<td>→ AFS/AFM60 SSI</td>
<td>Absolute encoder</td>
</tr>
<tr>
<td>→ AHS/AHM36 SSI</td>
<td>Absolute encoder</td>
</tr>
</tbody>
</table>
SICK incremental and SSI absolute encoders can be programmed using a PC, industrial PC, or a control unit supplied by the customer via the RS-485 interface. An RS-485 interface is required for communication with the encoder. It is possible to change the encoder values during the process and without disconnecting the electrical connection. This means that a new encoder setting can be programmed within seconds and rapid changeover of machine properties is guaranteed.

**At a glance**
- Programming in assembled state
- No programming software required, programming via control commands
- Encoder settings stored in the control unit or the industrial PC
- Functions are independent of the control unit manufacturer
- Switch between write mode and read mode using digital I/O card
- Connection to encoder via signal lines provided by the customer and RS-485 or RS-232 card

**Your benefits**
- Programming without electrical and mechanical disassembly
- Real-time changes to the encoder properties during operation
- Optimum integration into customer-specific control environment
- Customer-specific programming and evaluation functions

**Fields of application**
- Ideal for fast programming directly in the production line while processes are running, or during format adjustment

### Programmed encoders

<table>
<thead>
<tr>
<th>Programmable encoder</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DFV60</td>
<td>Measuring wheel encoder, incremental encoder</td>
</tr>
<tr>
<td>DFS60</td>
<td>Incremental encoder</td>
</tr>
<tr>
<td>DFS2x</td>
<td>Incremental encoder</td>
</tr>
<tr>
<td>AFS/AFM60 SSI</td>
<td>Absolute encoder</td>
</tr>
<tr>
<td>AHS/AHM36 SSI</td>
<td>Absolute encoder</td>
</tr>
</tbody>
</table>
DIRECT ACCESS VIA FIELDBUS/ETHERNET

SICK absolute encoders can be programmed using the relevant engineering software and the control unit supplied by the customer via the fieldbus interface without a programming unit or any additional software. It is possible to change the encoder values during the process without disconnecting the electrical connection. This means that a new encoder setting can be programmed in seconds and rapid changeover of machine properties is guaranteed. On Ethernet-based encoders, there are function blocks available which make even complex programming tasks much simpler. As a result, the work required for programming and the error rate are significantly reduced. The encoders also have various diagnostics options. An office PC, industrial PC, or control unit can be used as the user interface.

At a glance
- Flexible programming options: in the workplace or directly in assembled state
- Supports function blocks and makes complex programming tasks easier
- Comprehensive diagnostic functions
- No programming software required, programming via control commands
- Encoder settings stored in the control unit or the industrial PC

Your benefits
- Programming without electrical and mechanical disassembly
- Less work required for programming and reduced frequency of errors due to pre-assembled function blocks
- Reduction in service and maintenance due to preventative diagnostic evaluation
- Customer-specific programming and evaluation functions
- Cost savings for storage and data management due to reduced variant diversity because it can be programmed freely

Fields of application
- Programming absolute encoders with standard fieldbus interfaces and Ethernet-based interfaces

<table>
<thead>
<tr>
<th>Programmable encoder</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFS/AFM60 EtherNet/IP</td>
<td>Absolute encoder</td>
</tr>
<tr>
<td>A3M60 PROFINET</td>
<td>Absolute encoder</td>
</tr>
<tr>
<td>ATM60 PROFIBUS</td>
<td>Absolute encoder</td>
</tr>
<tr>
<td>AHS/AHM36 CANopen</td>
<td>Absolute encoder</td>
</tr>
<tr>
<td>AFS/AFM60 PROFINET</td>
<td>Absolute encoder</td>
</tr>
<tr>
<td>AFS/AFM60 EtherCAT</td>
<td>Absolute encoder</td>
</tr>
<tr>
<td>ATM60 CANopen</td>
<td>Absolute encoder</td>
</tr>
<tr>
<td>ATM60 DeviceNet</td>
<td>Absolute encoder</td>
</tr>
<tr>
<td>ATM90 PROFIBUS</td>
<td>Absolute encoder</td>
</tr>
</tbody>
</table>
INTEGRATED AND SIMPLE REMOTE ACCESS

The encoders can be programmed easily via the integrated web server. To do this, a device capable of running a browser, such as a PC, laptop computer, iPad, or HMI (human machine interface) is required for visualization. No interface-specific technical knowledge is required. The encoders can be programmed directly on the control unit via the interface or via the web browser. Combined access is also possible. The device can be replaced easily using plug and play as the encoder data is mirrored on the control unit side and can be downloaded onto the new device. The encoders also have an integrated FTP server which makes it possible to update firmware directly in the application. The new option for programming via a web browser allows people with varying levels of interface knowledge to access the encoder data, which allows for flexible implementation, service, and maintenance.

At a glance
- Active web server installed as a programming tool
- Integrated FTP server
- Easy device replacement, plug and play
- No programming software required
- Comprehensive diagnostic functions

Your benefits
- No interface-specific technical knowledge is required
- Less work required for programming and reduced frequency of errors due to simple operation
- Reduction in service and maintenance due to preventative diagnostic evaluation
- Cost savings for storage and data management due to reduced variant diversity because it can be programmed freely

Fields of application
- Programming absolute encoders with Ethernet-based interfaces and integrated web server functionality

Programmable encoder | Description
--- | ---
AFS/AFM60 EtherNet/IP | Absolute encoder
SICK encoders provide a wide range of programmable properties to meet your individual requirements and streamline your processes – these include resolution, electrical interfaces, offset/zero-set, and round axis functionality. The table below gives an overview of the type-specific programmable parameters.

<table>
<thead>
<tr>
<th>Encoder</th>
<th>Programming functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incremental encoder</td>
<td>Number of lines  x x x  &lt;br&gt; TTL/HTL electrical interface  x x x  &lt;br&gt; Zero pulse width, electrical  x x x  &lt;br&gt; Zero pulse width, mechanical  x x x  &lt;br&gt; Signal sequence/direction of rotation  x x x  &lt;br&gt; Reset to factory settings  x x x  &lt;br&gt; Set zero point  x x x</td>
</tr>
<tr>
<td>Absolute encoder</td>
<td>Singleturn scaling  x x x x x x x x x x x  &lt;br&gt; Multiturn scaling  x x x x x x x x x x x  &lt;br&gt; Counting direction CW/CCW  x x x x x x x x x x x  &lt;br&gt; Reset/preset value  x x x x x x x x x x x  &lt;br&gt; Speed format  x x x x x x x x x x x  &lt;br&gt; Round axis functionality  x x x x x x x x x x x  &lt;br&gt; Diagnostics  x x x x x</td>
</tr>
</tbody>
</table>

**Description of programming functions**

- **Number of lines**: Number of pulses emitted by the encoder per mechanical rotation.
- **TTL/HTL electrical interface**: Choice between TTL-compatible or HTL-compatible signal output.
- **Zero pulse width, electrical**: Width of the zero pulse (= length of the high signal) in relation to an impulse period.
- **Zero pulse width, mechanical**: Width of the zero pulse in relation to a mechanical revolution of the shaft.
- **Signal sequence/direction of rotation**: This function can be used to change the signal sequence: A leads B – A comes before B when rotating in a clockwise direction and looking at the shaft. B leads A – B comes before A when rotating in a clockwise direction and looking at the shaft.
- **Reset to factory settings**: All programmable values are reset to the values in place when the encoder left the production plant.
- **Set zero point**: This function can be used to change the position of the zero pulse on a mechanical rotation of the encoder. The zero point is assigned to the current position of the encoder. The rotary encoder should not be rotated while the function is being executed.
- **Singleturn scaling**: Adjustability of the resolution output by the encoder per rotation.
- **Multiturn scaling**: Adjustability of the resolution output by the encoder via the number of rotations.
- **Counting direction CW/CCW**: Counting direction rising/falling.
- **Reset/preset value**: Resets the position value to zero (preset)/resets the position value to a preset value.
- **Speed format**: Selects the appropriate speed format (e.g., rpm, rps, etc.).
- **Round axis functionality**: The round axis functionality permits resolutions for non-integer numbers of rotations (e.g., 3,600 steps at 2.75 rotations).
- **Diagnostics**: Additional data provided by the encoder (such as temperature monitoring, elapsed hour counter, speed monitoring, etc.).