

*When Every Movement Counts...*

***MINI SAXOPHONE***

*The miniature, integrated servo drive*



## General Description

The Mini - SAXOPHONE series of servo drives, for permanent magnet synchronous motors, is designed for the sophisticated industrial market of high performance automated machinery. They incorporate a digital motion controller, featuring networking, position loop, velocity loop, current loop and sinusoidal commutation. The Mini-SAXOPHONE is available in 3 different configurations:

- A fully digital velocity mode amplifier - Standard version
- A network drive for distributed intelligence concepts, with high performance motion capabilities, including a CAN interface - Plus version
- A "stand alone" device with advanced motion capabilities to fully control a servo axis - PlusPlus version

All the adjustments including position, velocity, current and commutation functions are accomplished via the serial communication line. The power source to the Mini-SAXOPHONE series is 3 phase 230VAC to 480VAC. Models for single phase 115VAC to 230VAC are also available. The control and the auxiliary supplies are derived from a 24VDC supply that is isolated from the power DC bus. This allows a safe and economical "power back up" feature that is essential for positioning systems. The product meets UL508c and the relevant CE regulations.

## Common Features

- Operation directly from the "Mains"
- Integrated power supply with shunt regulator
- A separate 24VDC supply enables a safe "Emergency" power down
- Operation in Current-, Velocity-, Position- Mode
- PTP, PT, PVT, ECAM, Follower, Pulse & Direction and Dual Loop Motion Modes
- Event capturing inputs
- Event triggered programming structure
- Two differential analog inputs with 12 bit resolution
- Enable input, limit switch and emergency stop handling - FLS & RLS, Stop
- Uncommitted, programmable I/O's
- Fault indication relay
- RS232 for axis start-up, set-up, and testing
- 7 segment display status indicator
- Standard feedback: encoder & Hall sensors or encoder only.
- A large, non volatile memory for the storage of the controller parameters and user programs
- Windows™ based "Composer" software for set-up, start-up and tuning
- Automatic analysis of the kinematics
- Automatic feedback alignment
- Auto tuning for position-, velocity-, and current- loop adjustments
- Bookshelf format

## Optional Features

- Resolver feedback
- CANOpen Interface DS301, V4.0
- RS485 Interface

## Protective Features

- Software error handling, emergency stop and status reporting
- Inrush current limit
- Short between the motor power outputs
- Short between the motor power outputs and ground
- Excess temperature
- Under/Over voltage
- Failure of the internal power supplies
- Loss or wrong commutation signals
- Loss of velocity feedback
- Communication error
- Overload of the shunt circuit

## Dedicated Features

| <b>Feature</b>                      | <b>Standard</b> | <b>Plus</b> | <b>PlusPlus</b> |
|-------------------------------------|-----------------|-------------|-----------------|
| CAN interface                       | no              | yes         | yes             |
| Current mode                        | yes             | yes         | yes             |
| Velocity mode                       | yes             | yes         | yes             |
| Velocity follower                   | no              | yes         | yes             |
| Position jog                        | no              | yes         | yes             |
| Position follower                   | no              | no          | yes             |
| PT Position versus time mode        | no              | yes         | yes             |
| PTP Point to point position mode    | no              | yes         | yes             |
| PVT Position & velocity versus time | no              | yes         | yes             |
| ECAM                                | no              | no          | yes             |
| Pulse & direction input             | no              | no          | yes             |
| Dual loop, position/velocity        | no              | no          | yes             |
| Event capturing inputs              | 0               | 0           | 2               |
| Uncommitted inputs                  | 2               | 2           | 6               |
| Uncommitted outputs                 | 2               | 2           | 4               |
| User program size                   | 2kB             | 2kB         | 32kB            |

**Flexible Mounting**

The unit can be mounted to a back panel with two screws or via DIN rail mount.

**CANopen Interface**  
An isolated interface that is compliant with CANopen communication protocol DS301-V4.0

**7 Segment Display**  
Highly visible status indication

**Analog I/O's**  
2 Programmable Analog Inputs, ±10VDC range, 12 bit resolution.  
For velocity command reference, current command or a combination of both

**General Communication Interface**  
RS232 up to 19200Baud  
Optional RS485 up to 38400Baud

**Committed I/O's**  
Forward & Reverse Limit Switches, Amplifier Enable Input, Emergency Stop, Fault Indication Relay

**General I/O's**  
Up to 6+6 uncommitted, optoisolated I/O's, all fully programmable

**Auxiliary Input**  
Used as Master input for: Velocity Follower mode, Position Follower mode, Pulse & Direction Input, ECAM mode, Dual Loop

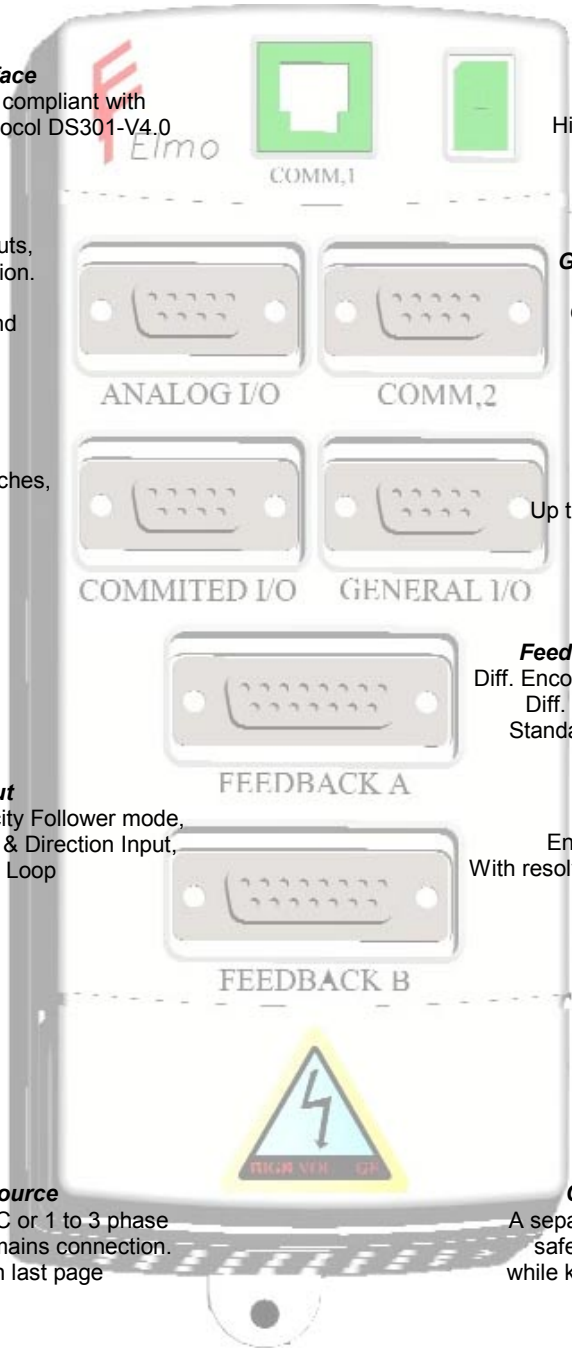
**Feedback Connector**  
Diff. Encoder & Hall Sensors or Diff. Encoder Only or Standard Type Resolver

**Encoder Output**  
Encoder outputs RS422  
With resolver option 1024ppr resolution

**Power Source**  
3 phase 230/480VAC or 1 to 3 phase 115/230VAC direct mains connection.  
See details on last page

**Control Voltage Supply**  
A separate 24VDC supply enables a safe "Emergency" power down, while keeping the control logic active

**Motor Output**  
The motor can be rotary or linear



## Technical Specifications

### Power Ratings

| <b>Model</b>               |       | <b>MIS<br/>1/230</b> | <b>MIS<br/>2/230</b> | <b>MIS<br/>3/230</b> | <b>MIS<br/>5/230</b> |
|----------------------------|-------|----------------------|----------------------|----------------------|----------------------|
| AC Supply voltage min.     | [VAC] | 60                   | 60                   | 60                   | 60                   |
| Rated AC Supply            | [VAC] |                      |                      | 1 or 3 x 230         |                      |
| AC Supply voltage max.     | [VAC] |                      |                      | 1 or 3 x 270         |                      |
| Switch off threshold       | [VDC] | 380                  | 380                  | 380                  | 380                  |
| Cont. current limit (RMS)* | [A]   | 1.5                  | 2                    | 3.5                  | 5                    |
| Peak current limit (RMS)   | [A]   | 3                    | 4                    | 7                    | 10                   |
| Pulse power, shunt circuit | [kW]  | 1.5                  | 1.5                  | 3                    | 3                    |

| <b>Model</b>               |       | <b>MIS<br/>1/400</b> | <b>MIS<br/>2/400</b> | <b>MIS<br/>3/400</b> | <b>MIS<br/>4/400</b> |
|----------------------------|-------|----------------------|----------------------|----------------------|----------------------|
| AC Supply voltage min.     | [VAC] | 140                  | 140                  | 140                  | 140                  |
| Rated AC Supply            | [VAC] |                      |                      | 3 x 400              |                      |
| AC Supply voltage max.     | [VAC] |                      |                      | 3 x 480              |                      |
| Switch off threshold       | [VDC] | 760                  | 760                  | 760                  | 760                  |
| Cont. current limit (RMS)* | [A]   | 1                    | 1.5                  | 2.5                  | 3.5                  |
| Peak current limit (RMS)   | [A]   | 2                    | 3                    | 5                    | 7                    |
| Pulse power, shunt circuit | [kW]  | 1.5                  | 1.5                  | 3                    | 3                    |

|                            |             |  |  |                                     |  |
|----------------------------|-------------|--|--|-------------------------------------|--|
| Auxiliary supply voltage   | [V]         |  |  | 18...40VDC                          |  |
| Auxiliary supply power     | [VA]        |  |  | 30                                  |  |
| Inrush current limit       | [A]         |  |  | <110                                |  |
| Efficiency @ rated power   | [%]         |  |  | >97                                 |  |
| PWM switching frequency    | [kHz]       |  |  | default 18 ±5%                      |  |
| Switching method           |             |  |  | advanced unipolar PWM               |  |
| Current loop bandwidth     | [kHz]       |  |  | >1.2                                |  |
| Max. Heat sink temperature | [°C] (°F)   |  |  | 80 (176)                            |  |
| Operating temperature**    | [°C] (°F)   |  |  | 0...45 (32...113)                   |  |
| Storage temperature        | [°C] (°F)   |  |  | -20...85 (-4...185)                 |  |
| Humidity                   | -           |  |  | max. 90% non condensing             |  |
| Operating altitude A.S.L.  | [m] (feet)  |  |  | 2000 (6000)                         |  |
| Protection level           | -           |  |  | IP20                                |  |
| Weight                     | [kg] (LBS)  |  |  | 1.1 (2.40)                          |  |
| Overall dimensions         | [mm] (inch) |  |  | 180 x 123 x 75 (7.08 x 4.84 x 2.95) |  |

\* @fPWM <10kHz

\*\* 0...60°C (32...140°F) with derating



**Elmo Motion Control**

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