

## Active Line Modules in booksize format

### Overview



Active Line Module in booksize format

Active Line Modules are self-commutated infeed/regenerative feedback units (with IGBTs in the infeed and regenerative feedback directions) that generate a controlled DC link voltage. This means that the connected Motor Modules are decoupled from the line voltage. Line voltage fluctuations within the permissible supply tolerances have no effect on the motor voltage. Active Line Modules are designed for connection to grounded star (TN, TT) and non-grounded symmetrical (IT) supply systems.

The DC link is pre-charged via integrated precharging resistors.

**In order to operate an Active Line Module, an associated Active Interface Module is required.**

### Design

The Active Line Modules in booksize format feature the following connections and interfaces as standard:

- 1 power connection via screw-type terminals
- 1 connection for the 24 V DC electronics power supply via the 24 V terminal adapter included in the scope of supply
- 1 DC link connection via integrated DC link busbars
- 3 DRIVE-CLiQ sockets
- 2 PE (protective earth) connections
- 1 temperature sensor input for KTY84-130, Pt1000 or PTC (Pt1000 can be used from firmware V4.7 HF17)

The status of the Active Line Modules is indicated via two multi-color LEDs.

For the Active Line Module with a width of 100 mm (3.94 in), the shield of the power connection cable can be connected to the integrated shield connection plate by means of a shield connection clamp or hose clip, e.g. Weidmüller type KLBÜ CO 4. The shield connection clamp must not be used as a strain relief mechanism. Shield connection sets are available for the 150 mm (5.91 in), 200 mm (7.87 in) and 300 mm (11.81 in) wide Active Line Modules.

The signal cable shield can be connected to the Active Line Module by means of a shield connection clamp, e.g. Weidmüller type KLBÜ 3-8 SC.

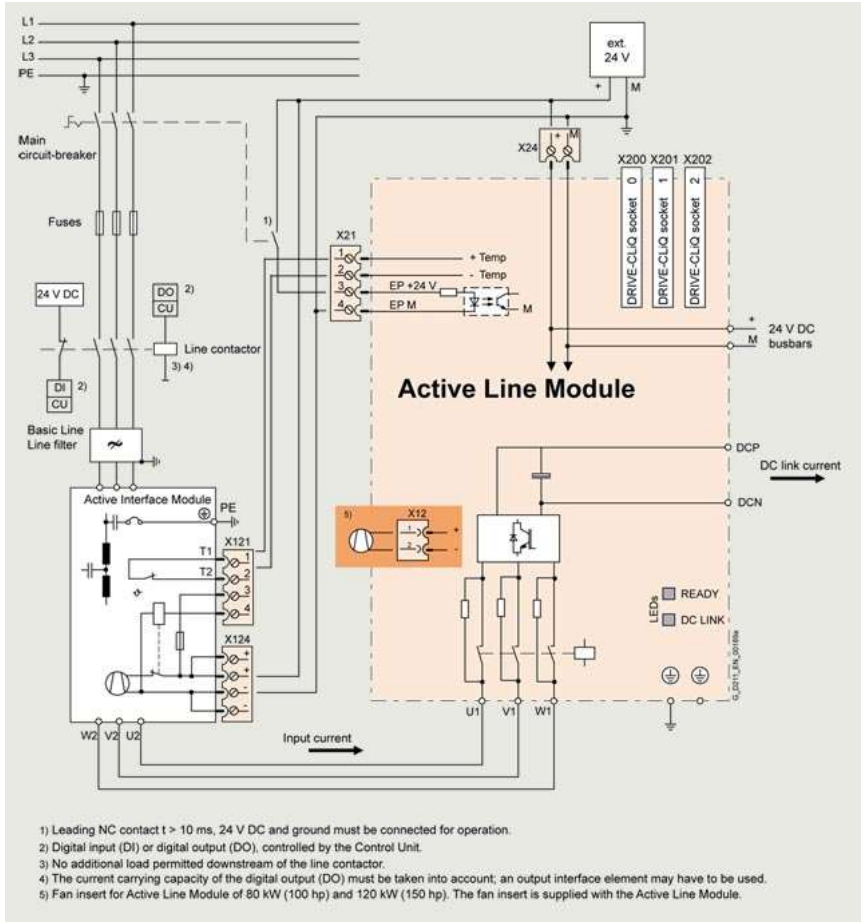
**The scope of supply of the Active Line Modules includes:**

- DRIVE-CLiQ cable for connection to the adjacent Control Unit on the left for drive control, length 0.11 m (4.33 in)
- DRIVE-CLiQ cable (length depends on Active Line Module width) for connection to the adjacent Motor Module, length = width of Active Line Module + 0.11 m (4.33 in)
- 2 blanking plugs for sealing unused DRIVE-CLiQ sockets
- Jumper for connecting the 24 V DC busbar to the adjacent Motor Module
- 24 V terminal adapter (X24)
- Connector X21 for digital inputs
- Fan insert for Active Line Modules of 80 kW (100 hp) and 120 kW (150 hp) (the voltage for the fan unit is supplied by the Active Line Module)
- 1 set of warning labels in 30 languages

### Integration

The Active Line Module receives its control information via DRIVE-CLiQ from:

- CU320-2 Control Unit
- SINUMERIK 840D sl
- SINUMERIK ONE
- SINUMERIK MC
- SIMOTION D



Connection example of Active Line Module in booksize format

Technical specifications

|                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Active Line Module in booksize format</b><br><b>6SL3130-7TE...</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Line voltage</b><br>(up to 2000 m (6562 ft) above sea level)       | 380 ... 480 V 3 AC ±10 % (in operation -15 % <1 min)                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Line frequency</b>                                                 | 47 ... 63 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>SCCR (short-circuit current rating)</b>                            | 65 kA in conjunction with the recommended Class J fuse, or circuit breaker according to UL489 / CSA 22.2 No. 5-02<br>see recommended line-side components                                                                                                                                                                                                                                                                                                        |
| <b>Line power factor</b>                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| • Active mode                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| - Fundamental power factor (cos φ <sub>1</sub> )                      | 1 (factory setting), can be altered by inputting a reactive current setpoint                                                                                                                                                                                                                                                                                                                                                                                     |
| - Total (λ)                                                           | 1 (factory setting)                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| • Smart Mode                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| - Fundamental power factor                                            | >0.96                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| - Overall                                                             | 0.65 ... 0.9                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Overvoltage category</b><br>to EN 60664-1                          | Class III                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>DC link voltage V<sub>d</sub></b>                                  | In <u>Active Mode</u> , the DC link voltage is regulated and can be adjusted as a voltage decoupled from the line voltage.<br>In <u>Smart Mode</u> , the DC link voltage is kept in proportion to the line voltage at the mean rectified line voltage value.<br>Factory setting for DC link voltage:<br>380 ... 400 V 3 AC: 600 V (Active Mode)<br>400 ... 415 V 3 AC: 625 V (Active Mode)<br>416 ... 480 V 3 AC: 1,35 × line voltage (Smart Mode) <sup>1)</sup> |
| <b>Electronics power supply</b>                                       | 24 V DC -15 %/+20 %                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Radio interference suppression</b>                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| • Standard (Active Line Module + Active Interface Module)             | Category C3 to EN 61800-3 up to 350 m (1148 ft) total cable length                                                                                                                                                                                                                                                                                                                                                                                               |
| • With line filter                                                    | Category C2 according to EN 61800-3 up to 350 m (1148 ft) total cable length                                                                                                                                                                                                                                                                                                                                                                                     |

|                                                                           |                                                                                                                                                                         |
|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                           | <b>Active Line Module in booksize format</b><br><b>6SL3130-7TE...</b><br>Category C3 according to EN 61800-3 from 350 m to 1000 m (1148 ... 3281 ft) total cable length |
| Type of cooling                                                           | Internal air cooling (power units with increased air cooling by built-in fan)                                                                                           |
| Permissible ambient and coolant temperature (air)                         | 0 ... 40 °C (32 ... 104 °F) without derating,<br>> 40 ... 55 °C (104 ... 131 °F), see derating characteristics                                                          |
| during operation for line-side components, Line Modules and Motor Modules |                                                                                                                                                                         |
| Installation altitude                                                     | Up to 1000 m (3281 ft) above sea level without derating,<br>> 1000 ... 4000 m (3281 ... 13124 ft) above sea level, see derating characteristics                         |
| Declarations of conformity                                                | CE (Low Voltage and EMC Directives)                                                                                                                                     |
| Certificate of suitability                                                | cULus                                                                                                                                                                   |

<sup>1)</sup> Active Mode can also be selected if the connected motors are suitable for > 650 V DC.

|                                                               |                                              |                           |                           |                           |                           |                           |
|---------------------------------------------------------------|----------------------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| <b>Line voltage</b><br><b>380 ... 480 V 3 AC</b>              | <b>Active Line Module in booksize format</b> |                           |                           |                           |                           |                           |
| Internal air cooling                                          |                                              | <b>6SL3130-7TE21-6AA4</b> | <b>6SL3130-7TE23-6AA3</b> | <b>6SL3130-7TE25-5AA3</b> | <b>6SL3130-7TE28-0AA3</b> | <b>6SL3130-7TE31-2AA3</b> |
| Infeed/regenerative feedback power                            |                                              |                           |                           |                           |                           |                           |
| • Rated power $P_{rated}$                                     |                                              |                           |                           |                           |                           |                           |
| • At 380 V 3 AC                                               | kW                                           | 16                        | 36                        | 55                        | 80                        | 120                       |
| • At 460 V 3 AC <sup>5)</sup>                                 | (hp)                                         | (18)                      | (40)                      | (60)                      | (100)                     | (150)                     |
| • For S6 duty $P_{S6}$ (40 %)                                 | kW                                           | 21                        | 47                        | 71                        | 106                       | 145                       |
| • $P_{max}$                                                   | kW                                           | 35                        | 70                        | 91 (110 <sup>1)</sup> )   | 131                       | 175                       |
| <b>DC link current</b>                                        |                                              |                           |                           |                           |                           |                           |
| • At 600 V DC                                                 | A                                            | 27                        | 60                        | 92                        | 134                       | 200                       |
| • For S6 duty (40 %)                                          | A                                            | 35                        | 79                        | 121                       | 176                       | 244                       |
| • Maximum                                                     | A                                            | 59                        | 117                       | 152 (176 <sup>1)</sup> )  | 218                       | 292                       |
| <b>Input current</b>                                          |                                              |                           |                           |                           |                           |                           |
| • Rated current at 380/400/480 V 3 AC                         | A                                            | 26/25/21                  | 58/55/46                  | 88/84/70                  | 128/122/102               | 192/182/152               |
| • For S6 duty (40 %) at 400 V                                 | A                                            | 32                        | 71                        | 108                       | 161                       | 220                       |
| • At 400 V max.                                               | A                                            | 54                        | 107                       | 139 (168 <sup>1)</sup> )  | 200                       | 267                       |
| Current requirement<br>24 V DC electronics power supply, max. | A                                            | 1.1                       | 1.5                       | 1.9                       | 2                         | 2.5                       |
| <b>Current carrying capacity</b>                              |                                              |                           |                           |                           |                           |                           |
| • 24 V DC busbars                                             | A                                            | 20                        | 20                        | 20                        | 20                        | 20                        |
| • DC link busbars                                             | A                                            | 100                       | 200                       | 200                       | 200                       | 200                       |
| <b>DC link capacitance</b>                                    |                                              |                           |                           |                           |                           |                           |
| • Active Line Module                                          | µF                                           | 710                       | 1410                      | 1880                      | 2820                      | 3995                      |
| • Drive line-up, max.                                         | µF                                           | 20000                     | 20000                     | 20000                     | 20000                     | 20000                     |
| Power loss <sup>2)</sup>                                      | kW                                           | 0.28                      | 0.67                      | 0.95                      | 1.38                      | 2.24                      |
| Cooling air requirement                                       | m <sup>3</sup> /s (ft <sup>3</sup> /s)       | 0.016 (0.57)              | 0.031 (1.09)              | 0.044 (0.155)             | 0.144 (5.09)              | 0.144 (5.09)              |
| Sound pressure level<br>$L_{pA}$ (1 m)                        | dB                                           | <60                       | <65                       | <60                       | <73                       | <73                       |
| Line connection<br>U1, V1, W1                                 |                                              | Screw-type terminals (X1) | M6 screw studs (X1)       | M8 screw studs (X1)       | M8 screw studs (X1)       | M8 screw studs (X1)       |
| • Conductor cross-section, max.                               | mm <sup>2</sup>                              | 2.5 ... 10                | 2.5 ... 50                | 2.5 ... 95, 2 × 35        | 2.5 ... 120, 2 × 50       | 2.5 ... 120, 2 × 50       |

| Line voltage<br>380 ... 480 V 3 AC                          |         | Active Line Module in booksize format |                          |                    |                    |                    |
|-------------------------------------------------------------|---------|---------------------------------------|--------------------------|--------------------|--------------------|--------------------|
| Internal air cooling                                        |         | 6SL3130-7TE21-6AA4                    | 6SL3130-7TE23-6AA3       | 6SL3130-7TE25-5AA3 | 6SL3130-7TE28-0AA3 | 6SL3130-7TE31-2AA3 |
| Shield connection                                           |         | Integrated in the connector           | See Accessories          | See Accessories    | See Accessories    | See Accessories    |
| PE connection                                               |         | M5 screw                              | M6 screw                 | M6 screw           | M8 screw           | M8 screw           |
| Cable length, max.<br>Total of all motor cables and DC link |         |                                       |                          |                    |                    |                    |
| • Shielded                                                  | m (ft)  | 630 (2067) <sup>3)</sup>              | 630 (2067) <sup>3)</sup> | 1000 (3281)        | 1000 (3281)        | 1000 (3281)        |
| • Unshielded                                                | m (ft)  | 850 (2789)                            | 850 (2789)               | 1500 (4922)        | 1500 (4922)        | 1500 (4922)        |
| Degree of protection                                        |         | IP20                                  | IP20                     | IP20               | IP20               | IP20               |
| Dimensions                                                  |         |                                       |                          |                    |                    |                    |
| • Width                                                     | mm (in) | 100 (3.94)                            | 150 (5.91)               | 200 (7.87)         | 300 (11.81)        | 300 (11.81)        |
| • Height                                                    | mm (in) | 380 (14.96)                           | 380 (14.96)              | 380 (14.96)        | 380 (14.96)        | 380 (14.96)        |
| • - With fan <sup>4)</sup>                                  | mm (in) | —                                     | —                        | —                  | 629 (24.76)        | 629 (24.76)        |
| • Depth                                                     | mm (in) | 270 (10.63)                           | 270 (10.63)              | 270 (10.63)        | 270 (10.63)        | 270 (10.63)        |
| Weight, approx.                                             |         | kg (lb)                               | 7 (15.4)                 | 10 (22.0)          | 16 (35.3)          | 23 (50.7)          |

<sup>1)</sup> Higher peak output is possible in combination with the Active Interface Module 6SL3100-0BE25-5AB0 (for operating cycle constraints, see SINAMICS S120 Manual).

<sup>2)</sup> Power loss of Active Line Module at rated power including losses of 24 V DC electronics power supply.

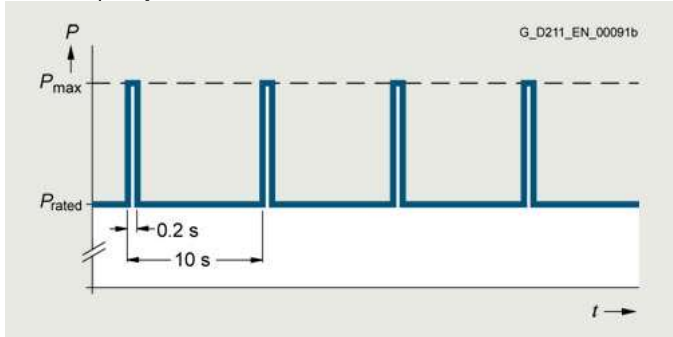
<sup>3)</sup> Max. cable lengths in combination with Active Interface Module and Basic Line Filter (Category C3 according to EN 61800-3).

<sup>4)</sup> The fan is supplied together with the Active Line Module and must be installed before the Active Line Module is commissioned.

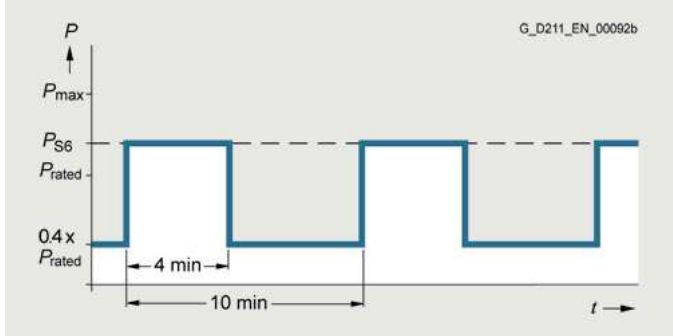
<sup>5)</sup> Nominal hp ratings are provided for ease of assigning components only. The Line Module outputs are dependent on the Motor Module loading and are to be dimensioned accordingly.

Characteristic curves

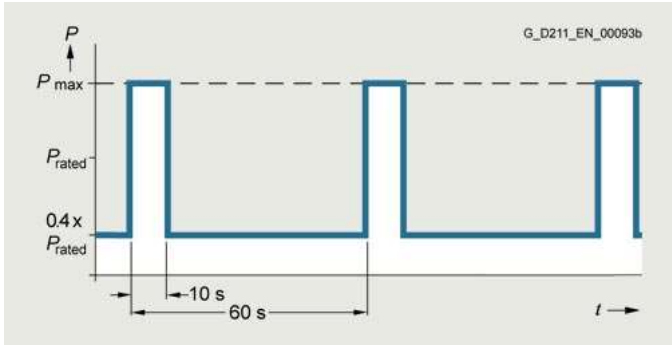
Overload capability



Duty cycle with previous load

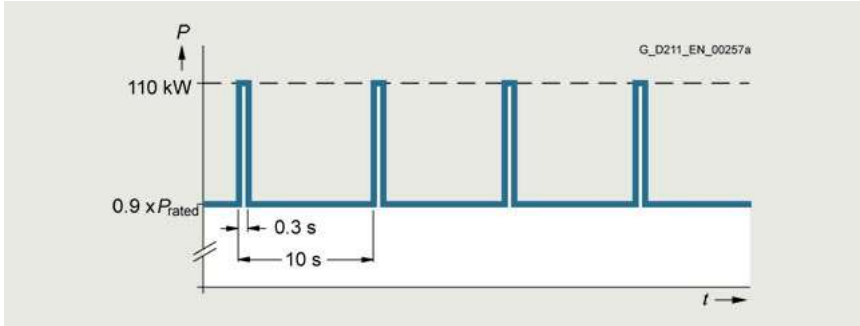


S6 duty cycle with previous load



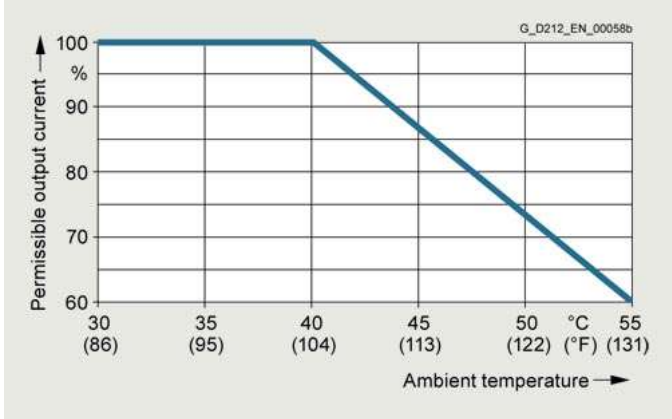
S6 duty cycle with previous load

55 kW Active Line Module only:



Peak power load duty cycle with previous load

Derating characteristics



Output power as a function of ambient temperature

Installation altitude

- >1000 ... 4000 m (3281 ... 13124 ft) above sea level
  - Reduction of the output current by 10 % per 1000 m (3281 ft), or
  - Reduction of the ambient temperature by 5 °C (9 °F) per 1000 m (3281 ft)
- >2000 ... 4000 m (6562 ... 13124 ft) above sea level
  - Operation on line supply systems with grounded neutral point, or
  - Operation with an isolating transformer with secondary grounded neutral point

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