

MANUFACTURER DOCUMENT PACKAGE

# Manufacturer's Manual

Reference package for procurement and maintenance review

SIEMENS

## 6ES7650-8BK60-0AA0

EIGHT-CHANNEL ANALOG OUTPUT MODULE

Used with the applicable SIMATIC industrial automation configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Siemens official manufacturer document: 6ES7650-8BK60-0AA0.pdf

ET 200PA SMART, analog output isolated, 8 AO; diagnostics;  
resolution 11/12 bit 40-pole, required in 650-8PH

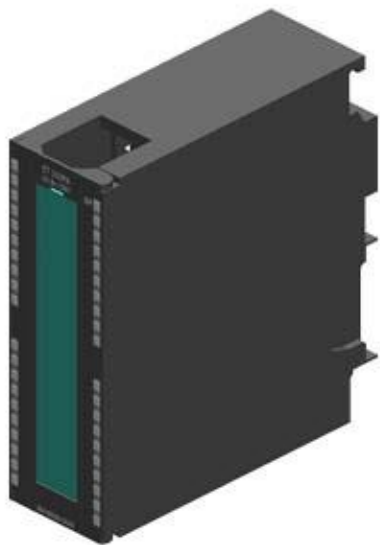


Figure similar

| General information                         |        |
|---------------------------------------------|--------|
| Product function                            |        |
| • Isochronous mode                          | No     |
| Supply voltage                              |        |
| Load voltage L+                             |        |
| • Rated value (DC)                          | 24 V   |
| • Reverse polarity protection               | Yes    |
| Input current                               |        |
| from load voltage L+ (without load), max.   | 340 mA |
| from backplane bus 5 V DC, max.             | 100 mA |
| Power loss                                  |        |
| Power loss, typ.                            | 6 W    |
| Analog outputs                              |        |
| Number of analog outputs                    | 8      |
| Voltage output, short-circuit protection    | Yes    |
| Voltage output, short-circuit current, max. | 25 mA  |

|                                                                            |                                                                                                               |
|----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Current output, no-load voltage, max.                                      | 18 V                                                                                                          |
| Output ranges, voltage                                                     |                                                                                                               |
| • 0 to 10 V                                                                | Yes                                                                                                           |
| • 1 V to 5 V                                                               | Yes                                                                                                           |
| • -10 V to +10 V                                                           | Yes                                                                                                           |
| Output ranges, current                                                     |                                                                                                               |
| • 0 to 20 mA                                                               | Yes                                                                                                           |
| • -20 mA to +20 mA                                                         | Yes                                                                                                           |
| • 4 mA to 20 mA                                                            | Yes                                                                                                           |
| Connection of actuators                                                    |                                                                                                               |
| • for voltage output four-wire connection                                  | Yes                                                                                                           |
| • for current output two-wire connection                                   | Yes                                                                                                           |
| Load impedance (in rated range of output)                                  |                                                                                                               |
| • with voltage outputs, min.                                               | 1 k $\Omega$                                                                                                  |
| • with voltage outputs, capacitive load, max.                              | 1 $\mu$ F                                                                                                     |
| • with current outputs, max.                                               | 500 $\Omega$                                                                                                  |
| • with current outputs, inductive load, max.                               | 10 mH                                                                                                         |
| Destruction limits against externally applied voltages and currents        |                                                                                                               |
| • Voltages at the outputs towards MANA                                     | 18 V; continuous; 75 V for max. 1 s (mark to space ratio 1:20)                                                |
| • Current, max.                                                            | 50 mA; DC                                                                                                     |
| Cable length                                                               |                                                                                                               |
| • shielded, max.                                                           | 200 m                                                                                                         |
| Analog value generation for the outputs                                    |                                                                                                               |
| Integration and conversion time/resolution per channel                     |                                                                                                               |
| • Resolution with overrange (bit including sign), max.                     | 12 bit; $\pm 10$ V, $\pm 20$ mA, 4 mA to 20 mA, 1 V to 5 V: 11 bit + sign; 0 V to 10 V, 0 mA to 20 mA: 12 bit |
| • Conversion time (per channel)                                            | 0.8 ms                                                                                                        |
| Settling time                                                              |                                                                                                               |
| • for resistive load                                                       | 0.2 ms                                                                                                        |
| • for capacitive load                                                      | 3.3 ms                                                                                                        |
| • for inductive load                                                       | 0.5 ms; 0.5 ms (1 mH); 3.3 ms (10 mH)                                                                         |
| Errors/accuracies                                                          |                                                                                                               |
| Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-)     | 0.05 %                                                                                                        |
| Linearity error (relative to output range), (+/-)                          | 0.05 %                                                                                                        |
| Temperature error (relative to output range), (+/-)                        | 0.002 %/K                                                                                                     |
| Crosstalk between the outputs, min.                                        | 40 dB                                                                                                         |
| Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) | 0.05 %                                                                                                        |
| Operational error limit in overall temperature range                       |                                                                                                               |
| • Voltage, relative to output range, (+/-)                                 | 0.5 %                                                                                                         |
| • Current, relative to output range, (+/-)                                 | 0.6 %                                                                                                         |

|                                                                |                                                                                                |
|----------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Basic error limit (operational limit at 25 °C)                 |                                                                                                |
| • Voltage, relative to output range, (+/-)                     | 0.4 %                                                                                          |
| • Current, relative to output range, (+/-)                     | 0.5 %                                                                                          |
| Interrupts/diagnostics/status information                      |                                                                                                |
| Diagnostics function                                           | Yes; Parameterizable                                                                           |
| Substitute values connectable                                  | Yes; channel by channel, parameterizable                                                       |
| Alarms                                                         |                                                                                                |
| • Diagnostic alarm                                             | Yes; Parameterizable                                                                           |
| Diagnostic messages                                            |                                                                                                |
| • Diagnostic information readable                              | Yes; possible                                                                                  |
| Diagnostics indication LED                                     |                                                                                                |
| • Group error SF (red)                                         | Yes                                                                                            |
| Potential separation                                           |                                                                                                |
| Potential separation analog outputs                            |                                                                                                |
| • between the channels                                         | No                                                                                             |
| • between the channels and backplane bus                       | Yes                                                                                            |
| • Between the channels and load voltage L+                     | Yes                                                                                            |
| • between the channels and the power supply of the electronics | Yes                                                                                            |
| Permissible potential difference                               |                                                                                                |
| between MANA and M internally (UIISO)                          | 75 V DC/60 V AC                                                                                |
| between S- and MANA (UCM)                                      | 3 V DC                                                                                         |
| Isolation                                                      |                                                                                                |
| Isolation tested with                                          | 500 V DC                                                                                       |
| Connection method                                              |                                                                                                |
| required front connector                                       | 40-pin                                                                                         |
| Dimensions                                                     |                                                                                                |
| Width                                                          | 40 mm                                                                                          |
| Height                                                         | 125 mm                                                                                         |
| Depth                                                          | 120 mm                                                                                         |
| Weights                                                        |                                                                                                |
| Weight, approx.                                                | 272 g                                                                                          |
| <b>last modified:</b>                                          | 07/30/2020  |