



SM15K - Interface modules



| Models | Description |
|---------------|---------------------------------|
| INT MOD ANA | Isolated Analog interface |
| INT MOD ANY | Anybus-carrier interface |
| INT MOD CON | Isolated Contacts interface |
| INT MOD DIG | Digital I/O interface |
| INT MOD M/S 2 | Master/Slave interface |
| INT MOD SER | Multi-protocol Serial interface |

General Features

- Plug-and-play modules for the SM15K series power supplies
- Multiple interfaces possible per power supply
- Isolated from the output voltage
Working voltage 1000 V or 1500 V depending on type of unit
- Floating with respect to earth

Features INT MOD ANA

Analog programming interface

- High accuracy, low drift
- 16 bit AD and DA conversion
- Compatible with other Delta Elektronika 15p analog interfaces
- Factory calibrated for optimum accuracy

Features INT MOD ANY

Anybus-carrier interface

- Compatible with a variety of HMS Anybus CompactCom 40 inserts
- Web based configuration
- High speed programming and monitoring

Features INT MOD CON

Isolated contacts

- 4 relays with make-and-break contacts
- Additional (floating) Interlock with 24V enable system
- Programmable via Ethernet

Features INT MOD DIG

Digital (user) I/O

- 8 inputs Logic high = 2.5 ... 30V, Logic low = 0V
- 8 Open Drain outputs 0 - 30V, max. 200mA
- Programmable via Ethernet or sequences

Features INT MOD M/S-2

Master/Slave interface SM15K

- Easy control of series or parallel operation.
- Multiple power supplies behave as one power supply.
- Large systems, up to 900 kW

Features INT MOD SER

Serial programming interface SM15K

- Multi-protocol: RS232, RS485, RS422, USB
- Web based configuration
- Speeds up to 115.2 kbps

SM15K Interfaces Combinations

Most of the interface types can be combined with others. There are some limitations.

| | INT MOD ANA | INT MOD ANY | INT MOD CON | INT MOD DIG | INT MOD M/S-2 | INT MOD SER |
|---------------|-------------|-------------|-------------|-------------|---------------|-------------|
| INT MOD ANA | | | | | | |
| INT MOD ANY | | | | | | |
| INT MOD CON | | | | | | |
| INT MOD DIG | | | | | | |
| INT MOD M/S-2 | | | | | | |
| INT MOD SER | | | | | | |



Combination allowed



Multiple interfaces of this type allowed



Combination not allowed

For the total amount per type and the allowed slots, please check the information on the corresponding interface page in this document, under "Mounting".

Isolated Analog Interface - INT MOD ANA



Typical Applications

- Analog programming of voltage and current
- Analog monitoring of voltage and current
- Remote monitoring of the status signals: OverTemp, Limit
- Remote Shut down of the power output using a 5V signal

Specifications

| Analog Programming | | CV | CC |
|------------------------------------|--|---|--|
| Programming inputs | | | |
| Input range | | 0 - 5 / 0 - 10 V | 0 - 5 / 0 - 10 V ¹ |
| Accuracy | | ± 0.2 % | ± 0.2 % |
| Offset | | - 1 ... + 1 mV (on 5 V) | - 1 ... + 1 mV (on 5 V) |
| Temp. coeff. offset | | 10 µV / °C | 10 µV / °C |
| Input impedance | | 10 MΩ | 10 MΩ |
| Monitoring output | | | |
| Output range | | 0 - 5 / 0 - 10 V | - 5 to + 5 V / - 10 to + 10 V |
| Accuracy | | ± 0.2 % | ± 0.2 % |
| Offset | | - 1 ... + 1 mV (on 5 V) | - 1 ... + 1 mV (on 5 V) |
| Temp. coeff. Offset | | 3 µV / °C | 60 µV / °C |
| Output impedance | | 2 Ω / max. 4 mA | 2 Ω / max. 4 mA |
| Reference voltage | | 5.114 V ± 15 mV (R _o = 2 Ω, max. 4 mA) | |
| On prog. connector | V _{ref} TC | 20 ppm | |
| +12 V output | | 12 V ± 0.2 V | |
| on prog. Connector | V _o I _{max} R _o | 0.2 A 5 Ω | |
| Status outputs | | | |
| CC - status | | CC - operation | 5 V = logic 1 (R _o = 500 Ω) |
| LIM - status | | CV or CC limit | 5 V = logic 1 (R _o = 500 Ω) |
| OT - status | | Over Temperature | 5 V = logic 1 (R _o = 500 Ω) |
| ACF - status | | AC - Fail | 5 V = logic 1 (R _o = 500 Ω) |
| DCF - status | | DC - Fail ² | 5 V = logic 1 (R _o = 500 Ω) |
| Remote Shutdown | | with +5 V, 1 mA or relay contact | |
| Insulation | | 1000 VDC Reinforced isolation acc. EN60950-1 / EN61010-1 with the exception of 1500 VDC for SM1500-CP-30 | |
| Prog.connector - internal circuits | | | |
| Prog.connector - earth | | Max. 60 VDC | |
| Safety | | EN 60950 / EN 61010 | |
| Operating Temperature | | -20 to +50 °C | |
| Humidity | | Max. 95% RH, non-condensing, up to 40 °C Max. 75% RH, non-condensing, up to 50 °C | |
| Storage temperature | | -40 to +70 °C | |
| Mounting³ | | Pluggable, SM15K interface slots 1, 2, 3 and slot 4. | |
| Programming connector | | 15 pole D-connector (female) | |
| Compatibility | | Cannot be combined with INT MOD ANY. | |
| Weight | | 140 g | |

¹ CC-prog input (pin3) sets both CC+ and CC- with 1 signal.

² V_{out} ±5% beyond set point

³ Max 1pc INT MOD ANA per unit.

Anybus carrier - INT MOD ANY

Typical Applications

- Carrier interface for HMS Networks Anybus® CompactCom M40 inserts
- Connecting the power supply to existing industrial fieldbus network
- Programming of voltage, current and power
- Monitoring of voltage, current and power
- Remote monitoring of the status signals: ACF, DCF, Interlock, and more
- Remote shutdown of the power output



Supported Anybus inserts

Interface between Power Supply and Industrial Field Buses via AnyBus CompactCom 40 insert:

- CANopen (AB6613)
- EtherCAT (AB6607)
- Ethernet/IP (AB6604)
- Modbus-TCP (AB6603)
- PROFIBUS (AB6600)
- PROFINET (AB6605)

Note: Both an INT MOD ANY and a CompactCom M40 insert are required to connect a power supply to one of the above fieldbuses.

Specifications

| | |
|---|---|
| Maximum Programming/Monitoring processing time^{4,5} | |
| Ethernet/IP | < 500 µs |
| EtherCAT | < 150 µs |
| Modbus-TCP | < 300 µs |
| CANopen | < 300 µs |
| PROFIBUS | t.b.d. |
| PROFINET-IRT | t.b.d. |
| Status update time | < 1ms |
| Insulation | |
| Prog.connectors - internal circuits | 1000 VDC Reinforced isolation acc. EN61010-1 with the exception of 1500 VDC for SM1500-CP-30. |
| Prog.connectors - earth | Max. 60 VDC |
| Safety | EN 61010 |
| Operating Temperature | -20 to +50 °C |
| Humidity | Max. 95% RH, non-condensing, up to 40 °C Max. 75% RH, non-condensing, up to 50 °C |
| Storage temperature | -40 to +70 °C |
| Mounting⁶ | Pluggable, SM15K interface slots 1, 2, 3 or slot 4. |
| Compatibility | Cannot be combined with INT MOD ANA. |
| Weight | 140 g ⁷ |

⁴ Excluding network latency and Power Supply response times

⁵ Measured using 16-bit Data Format A.

⁶ Max 1pc INT MOD ANY per unit.

⁷ Excluding AnyBus CompactCom 40 insert.

Isolated Contacts - INT MOD CON

Typical Applications

- Trigger an external safety alarm
- Interact in automated processes
- Switch the output On/Off with a remote 24Vdc signal
- Using a floating signal for triggering the Interlock function



Specifications

| | |
|-------------------------------------|--|
| Relay contacts 1... 4 | |
| Contact voltage | 60 V |
| Contact current | 2 A |
| Maximum switching capacity | 60 W |
| Floating Interlock | |
| Open circuit voltage | 5 V |
| Floating Enable | |
| Nominal input voltage | 24 VDC |
| Input voltage range | 15 - 30 VDC |
| Input impedance | 12 k Ω |
| Insulation | |
| Prog.connectors - internal circuits | 1000 VDC Reinforced isolation acc. EN60950-1 / EN61010-1 with the exception of 1500 VDC for SM1500-CP-30 |
| Prog.connectors - earth | Max. 60 VDC |
| Safety | EN 60950 / EN 61010 |
| Operating Temperature | -20 to +50 °C |
| Humidity | Max. 95% RH, non-condensing, up to 40 °C Max. 75% RH, non-condensing, up to 50 °C |
| Storage temperature | -40 to +70 °C |
| Mounting | Pluggable, SM15K interface slots 1, 2, 3 and slot 4. |
| Programming connector | Relay 1 & 2, via a 6 pole "FK-MC 0,5/ 6-ST-2,5" connector. Relay 3 & 4, via a 6 pole "FK-MC 0,5/ 6-ST-2,5" connector. Interlock and Enable via a 3 pole "FK-MC 0,5/ 3-ST-2,5" connector. Contra connectors supplied with interface. |
| Weight | 140 g |

Digital User I/O - INT MOD DIG

Typical Applications

- Hardware triggering of sequences
- Interaction with other equipment
- Stand-alone automation
- Safety or Alarm indications



Specifications

| | |
|--|---|
| Logic inputs 1... 8 Input range Input impedance Load current +5V | 2 – 30 V $R_{in} = 22 \text{ k}\Omega$ 100 mA |
| Logic outputs 1 ... 8 Output type Output impedance | Open Drain (True = 0V, False = open) 7 Ω (max 30V/200mA) |
| Insulation Prog.connectors - internal circuits | 1000 VDC Reinforced isolation acc. EN60950-1 / EN61010-1 with the exception of 1500 VDC for SM1500-CP-30 |
| Prog.connectors - earth | Max. 60 VDC |
| Safety | EN 60950 / EN 61010 |
| Operating Temperature | -20 to +50 °C |
| Humidity | Max. 95% RH, non-condensing, up to 40 °C Max. 75% RH, non-condensing, up to 50 °C |
| Storage temperature | -40 to +70 °C |
| Mounting | Pluggable, SM15K interface slots 1, 2, 3 and slot 4. |
| Programming connector | User Outputs via 15 pole D-connector High Density (female), User Inputs via 15 pole D-connector High Density (female). |
| Weight | 140 g |

Master Slave Interface - INT MOD M/S-2

Typical Applications

- Applications where more current or voltage is required than one power supply can deliver
- Applications where a symmetrical power supply is needed



Specifications

| | SM70-CP-450 | SM210-CP-150 | SM500-CP-90 | SM1000-CP-45 | SM1500-CP-30 |
|--|---|--------------|--|--------------|--------------|
| M/S Parallel operation Max. number of devices ⁸ Ripple + noise Programming Speed Additional programming time ⁹ Programming cable Max. cable length Min. sink voltage | 60 units Values of a single unit 2 x the values of a single unit 20 µs Modular connector cable S/FTP CAT6 8P8C 2 m At maximum current, value of a single unit | | | | |
| Recovery time | 3x the values of a single unit | | 2x the values of a single unit | | |
| M/S Series operation Max. voltage Max. number of devices ⁸ Additional programming time ⁹ Programming cable Max. cable length | Not possible | | 750 V ¹⁰ 1000 V ¹¹ 6 units 20 µs Modular connector cable S/FTP CAT6 8P8C 2 m | Not possible | |
| Safety | EN 60950 / EN 61010 | | | | |
| Operating Temperature | -20 to +50 °C | | | | |
| Humidity | Max. 95% RH, non-condensing, up to 40 °C Max. 75% RH, non-condensing, up to 50 °C | | | | |
| Storage temperature | -40 to +70 °C | | | | |
| Mounting¹² | Pluggable, SM15K interface slot 3 or slot 4. See paragraph 'Hardware Installation' in the operating manual. | | | | |
| Weight | 70 g | | | | |

⁸ For M/S setups, only use units of the same type

⁹ Typical

¹⁰ Units delivered before Q4 / 2018. Contact factory for upgrading to enable 1000V series operation for older units

¹¹ Units from Q4 / 2018 or newer

¹² Max 1pc INT MOD M/S-2 per unit.

Serial Interface (multi-protocol) - INT MOD SER

Typical Applications

- RS232 Programming
- Balanced RS422 Programming
- USB Programming
- Balanced RS485 Bi-directional Programming



Specifications

| | |
|--|---|
| Communication speeds (bps) | 2400, 4800, 9600, 19200, 38400, 57600, 115200 |
| Insulation Prog.connectors - internal circuits | 1000 VDC Reinforced isolation acc. EN60950-1 / EN61010-1 with the exception of 1500 VDC for SM1500-CP-30 |
| Prog.connectors - earth | Max. 60 VDC |
| Safety | EN 60950 / EN 61010 |
| Operating Temperature | -20 to +50 °C |
| Humidity | Max. 95% RH, non-condensing, up to 40 °C Max. 75% RH, non-condensing, up to 50 °C |
| Storage temperature | -40 to +70 °C |
| Mounting | Pluggable, SM15K interface slots 1, 2, 3 and slot 4. |
| Programming connector | RS422 & RS485 wires via a 4 pole FK-MC 0,5/ 4-ST-2,5 connector (contra header supplied) RS232 via 9 pole D-connector (female), USB socket type B. |
| Weight | 140 g |