



## SM15K - Interface modules

| Models        | Description                     |
|---------------|---------------------------------|
| INT MOD M/S-2 | Master/Slave interface SM15K    |
| INT MOD CON   | Isolated contacts interface     |
| INT MOD SER   | Multi-protocol serial interface |
| INT MOD DIG   | Digital I/O interface           |
| INT MOD ANA   | Isolated analog interface       |
| INT MOD ANY   | Fieldbus compatible interface   |

### General Features

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

### 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 900kW

### 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 SER

#### Serial controller interface SM15K

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

### 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 ANA

#### Analog controller 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

#### Fieldbus controller interface

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

SM15K Interfaces Combinations

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

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



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".

## 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 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------|--------------------------------------------------------------------------------------------------------------------------|--------------|--------------|
| <b>M/S Parallel operation</b><br>Max. number of devices <sup>1</sup><br>Ripple + noise<br>Programming Speed<br>Additional programming time <sup>2</sup><br>Programming cable<br>Max. cable length | 60 units<br>Values of a single unit<br>2 x the values of a single unit<br>20 µs<br>Modular connector cable S/FTP CAT6 8P8C<br>2 m |              |                                                                                                                          |              |              |
| Recovery time                                                                                                                                                                                     | 3x the values of a single unit                                                                                                    |              | 2x the values of a single unit                                                                                           |              |              |
| <b>M/S Series operation</b><br>Max. voltage<br><br>Max. number of devices <sup>1</sup><br>Additional programming time <sup>2</sup><br>Programming cable<br><br>Max. cable length                  | Not possible                                                                                                                      |              | 750 V <sup>3</sup><br>1000 V <sup>4</sup><br>6 units<br>20 µs<br>Modular<br>connector cable<br>S/FTP CAT6<br>8P8C<br>2 m | Not possible |              |
| <b>Safety</b>                                                                                                                                                                                     | EN 60950 / EN 61010                                                                                                               |              |                                                                                                                          |              |              |
| <b>Operating Temperature</b>                                                                                                                                                                      | -20 to +50 °C                                                                                                                     |              |                                                                                                                          |              |              |
| <b>Humidity</b>                                                                                                                                                                                   | Max. 95% RH, non-condensing, up to 40 °C<br>Max. 75% RH, non-condensing, up to 50 °C                                              |              |                                                                                                                          |              |              |
| <b>Storage temperature</b>                                                                                                                                                                        | -40 to +70 °C                                                                                                                     |              |                                                                                                                          |              |              |
| <b>Mounting</b> <sup>5</sup>                                                                                                                                                                      | Pluggable, SM15K interface slot 3 or slot 4.<br>See paragraph 'Hardware Installation' in the operating manual.                    |              |                                                                                                                          |              |              |
| <b>Weight</b>                                                                                                                                                                                     | 70 g                                                                                                                              |              |                                                                                                                          |              |              |

<sup>1</sup> For M/S setups, only use units of the same type

<sup>2</sup> Typical

<sup>3</sup> Units delivered before Q4 / 2018. Contact factory for upgrading to enable 1000V series operation for older units

<sup>4</sup> Units from Q4 / 2018 or newer

<sup>5</sup> Max 1pc INT MOD M/S-2 per unit.

## 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

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

## Serial Interface (multi-protocol) - INT MOD SER

### Typical Applications

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



### Specifications

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

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

# Isolated Analog Controller 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                                     |
|------------------------------------|------------------|----------------------------------------------------------|----------------------------------------|
| <b>Programming inputs</b>          |                  |                                                          |                                        |
| Input range                        |                  | 0 - 5 / 0 - 10 V                                         | 0 - 5 / 0 - 10 V <sup>6</sup>          |
| 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                                  |
| <b>Monitoring output</b>           |                  |                                                          |                                        |
| 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                        |
| <b>Reference voltage</b>           |                  | 5.114 V ±15 mV (R <sub>o</sub> = 2 Ω, max. 4 mA)         |                                        |
| On prog. connector                 | V <sub>ref</sub> | 20 ppm                                                   |                                        |
| <b>+12 V output</b>                |                  | 12 V ± 0.2 V                                             |                                        |
| on prog. Connector                 | V <sub>o</sub>   | 0.2 A                                                    |                                        |
|                                    | I <sub>max</sub> | 5 Ω                                                      |                                        |
|                                    | R <sub>o</sub>   |                                                          |                                        |
| <b>Status outputs</b>              |                  |                                                          |                                        |
| CC - status                        |                  | CC - operation                                           | 5 V = logic 1 (R <sub>o</sub> = 500 Ω) |
| LIM - status                       |                  | CV or CC limit                                           | 5 V = logic 1 (R <sub>o</sub> = 500 Ω) |
| OT - status                        |                  | Over Temperature                                         | 5 V = logic 1 (R <sub>o</sub> = 500 Ω) |
| ACF - status                       |                  | AC - Fail                                                | 5 V = logic 1 (R <sub>o</sub> = 500 Ω) |
| DCF - status                       |                  | DC - Fail <sup>7</sup>                                   | 5 V = logic 1 (R <sub>o</sub> = 500 Ω) |
| <b>Remote Shutdown</b>             |                  | with +5 V, 1 mA or relay contact                         |                                        |
| <b>Insulation</b>                  |                  | 1000 VDC Reinforced isolation acc. EN60950-1 / EN61010-1 |                                        |
| Prog.connector - internal circuits |                  | with the exception of 1500 VDC for SM1500-CP-30          |                                        |
| Prog.connector - earth             |                  | Max. 60 VDC                                              |                                        |
| <b>Safety</b>                      |                  | EN 60950 / EN 61010                                      |                                        |
| <b>Operating Temperature</b>       |                  | -20 to +50 °C                                            |                                        |
| <b>Humidity</b>                    |                  | Max. 95% RH, non-condensing, up to 40 °C                 |                                        |
|                                    |                  | Max. 75% RH, non-condensing, up to 50 °C                 |                                        |
| <b>Storage temperature</b>         |                  | -40 to +70 °C                                            |                                        |
| <b>Mounting<sup>8</sup></b>        |                  | Pluggable, SM15K interface slots 1, 2, 3 and slot 4.     |                                        |
| <b>Programming connector</b>       |                  | 15 pole D-connector (female)                             |                                        |
| <b>Compatibility</b>               |                  | Cannot be combined with INT MOD ANY.                     |                                        |
| <b>Weight</b>                      |                  | 140 g                                                    |                                        |

<sup>6</sup> CC-prog input (pin3) sets both CC+ and CC- with 1 signal.

<sup>7</sup> V<sub>out</sub> ±5% beyond set point

<sup>8</sup> Max 1pc INT MOD ANA per unit.

## AnyBus Module Interface - INT MOD ANY

### Typical Applications

- Connecting the power supply to existing industrial fieldbus network.
- Programming of voltage and current
- Monitoring of voltage and current
- Remote monitoring of the status signals: ACF, DCF, Interlock, etc.
- Remote shutdown of the power output



### Supported modules

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

- PROFIBUS
- PROFINET-IRT
- Ethernet/IP
- EtherCAT
- Modbus-TCP
- CANopen

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

### Specifications

|                                                                      |                                                                                               |
|----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| <b>Maximum Programming/Monitoring processing time<sup>9,10</sup></b> |                                                                                               |
| Ethernet/IP                                                          | < 500 µs                                                                                      |
| EtherCAT                                                             | < 150 µs                                                                                      |
| Modbus-TCP                                                           | < 300 µs                                                                                      |
| CANopen                                                              | < 300 µs                                                                                      |
| PROFIBUS                                                             | t.b.d.                                                                                        |
| PROFINET-IRT                                                         | t.b.d.                                                                                        |
| <b>Status update time</b>                                            | < 1ms                                                                                         |
| <b>Insulation</b>                                                    |                                                                                               |
| 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                                                                                   |
| <b>Safety</b>                                                        | EN 61010                                                                                      |
| <b>Operating Temperature</b>                                         | -20 to +50 °C                                                                                 |
| <b>Humidity</b>                                                      | Max. 95% RH, non-condensing, up to 40 °C<br>Max. 75% RH, non-condensing, up to 50 °C          |
| <b>Storage temperature</b>                                           | -40 to +70 °C                                                                                 |
| <b>Mounting<sup>11</sup></b>                                         | Pluggable, SM15K interface slots 1, 2, 3 or slot 4.                                           |
| <b>Compatibility</b>                                                 | Cannot be combined with INT MOD ANA.                                                          |
| <b>Weight</b>                                                        | 140 g <sup>12</sup>                                                                           |

<sup>9</sup> Excluding network latency and Power Supply response times

<sup>10</sup> Measured using 16-bit Data Format A.

<sup>11</sup> Max 1pc INT MOD ANY per unit.

<sup>12</sup> Excluding AnyBus CompactCom 40 Module.